NATURE MAGAZINE

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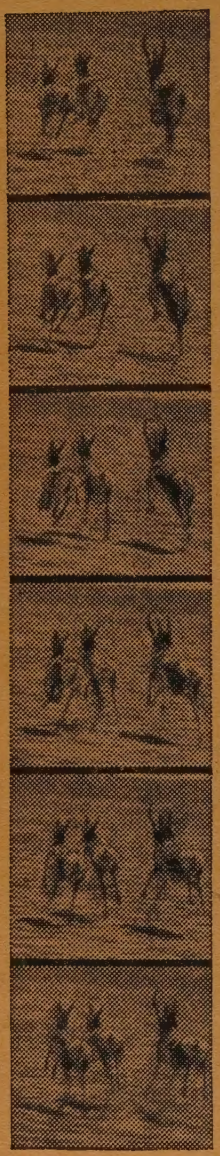

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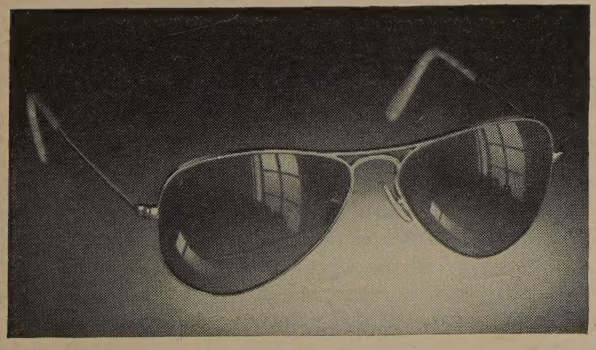

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Nature in Print

By HOWARD ZAHNISER

REPORTING a survey of post-war plans affecting natural resources, this magazine commented editorially last March on a "lack of coordination in thinking and planning," and cited the consideration of water resources as an example. "One agency," it was pointed out, "thinks of water only in terms of navigability of streams; another as a source of power; another for irrigation; another as habitat for commercial and sport fishes; another as a breeding place for mosquitoes and a means for carrying away human and industrial wastes."

These are valid comments, yet there is one part of the United States to which they apparently do not apply. It is the valley of the Tennessee River. True, there, as elsewhere in the nation, Federal agencies with special concerns are in operation; the exception is in the actual existence of "coordination in thinking and planning." The Forest Service, the Fish and Wildlife Service, the National Park Service, the Bureau of Mines, the Army Corps of Engineers, and many other Federal agencies have there been active, and of course in terms of their own dominant concerns. The coordination has come through the existence of another Federal agency—the Tennessee Valley Authority—an agency that is at one and the same time both Federal and Regional.

Perhaps this is the answer to the unrealized needs for coordination in the administration of our national natural resources; namely, the creation by the Federal Government of agencies that are regional. Perhaps in the nature of our government it is not possible to coordinate in Washington any more than we have. Perhaps it is in the nature of things that effective coordination must be done, if at all, very close to the resources.

However pertinent such generalized speculations may be, there seems to be no doubt that the experience of the Tennessee Valley Authority is rich in implications for those who are interested in an improved administration of natural resources, and in advances in democratic governmental devices. It behooves all of us to be aware of this experience, and fortunately two recent books have made this possible with a great deal of interest and pleasure.

"Out of our democracy," writes R. L. Duffus in *The Valley and Its People: A Portrait of TVA*, "in a period of economic depression, in a disturbed and revolutionary world, between two earth-shaking wars, came a great vision." The volume for which Mr. Duffus has provided the text is striking evidence of the fulfillment of this vision. The book can hardly fail to arouse enthusiasm in any reader, and it need only be seen to attract reading. Mr. Duffus's writing is reportorial but it is also emotional. TVA and its accomplishments are for him not subjects for unfeeling thought. They amaze and stir pride. The photographs that are so effectively reproduced in *The Valley and Its People* are in themselves exciting—more than a hundred of them, the book being about half photographs. This is a volume that should be widely circulated. While it deals little with wildlife, with forestry, with outdoors conservation—specifically—it does portray effectively the outstanding features of a new kind of governmental program that may have most profound effects on all conservation programs. Mr. Duffus declares that "the great vision" of which he wrote was "a vision of the future of a Valley," but it was more than that. Indeed, he says, "if it were only that it would not be significant. If a way has not been found in one valley to do things in other valleys, and on plains and mountains, we might as well pass on."

This being true, the other recently published volume on the Tennessee Valley Authority, by its chairman, becomes one of the most important of our current publications. Much of this importance is summed up in the title, *TVA—Democracy on the March*. The author, David E. Lilienthal, warns his readers at the outset that he is not writing with any "tone of Olympian neutrality." Absorbed for a decade in the work of TVA, he finds it impossible to be "passionless about a task so altogether heartening," and, furthermore, he believes "the world badly needs conviction." Consequently there are "convictions stated and conclusions pressed," as well as operations described and policies explained, and the resulting volume is as inspiring as it is informative. It is a most fervid and convincing statement of faith in democracy.

Mr. Lilienthal sees a prime need for moral purpose, and advocates two other essential principles: "First, that resource development must be governed by the unity of nature herself. Second, that the people must participate actively in the development."

Many Americans think of TVA as merely a power-development project of the Federal Government. And it is little wonder, so stupendous are the accomplishments to this end—sixteen new dams designed and constructed, using two and a half times as much concrete as used in all the locks and structures of the Panama Canal, five others improved and modified. Yet TVA is more than power development. It is river development, farm improvement, forest restoration, fish increase or, to spare a longer catalog, it is unified development of the natural resources for an entire region, and all that this involves.

Congress, in establishing TVA in 1933, did something new in American history in fixing upon "one agency the responsibility for results in resource development in a region." This new measure has been successful in the Tennessee Valley, and its like is being recommended by the President for other regions.

"That the letters TVA should be thus used as a kind of symbol for resource development is pleasing to us, naturally," says Mr. Lilienthal. "But references to TVA in connection with such proposals are inaccurate and misleading unless they do in fact adopt the TVA idea in its essentials,

—a federal autonomous agency, with authority to make its decisions in the region

—responsibility to deal with resources, as a unified whole, clearly fixed in the regional agency, not divided among several centralized federal agencies

—a policy, fixed by law, that the federal regional agency work co-operatively with and through local and state agencies."

TVA—Democracy on the March would seem to be essential reading to all those who are considering such regional agencies for their own regions, and it is difficult to see how anyone concerned with developments in methods of government or in natural-resource administration can afford to neglect this book. Its interest is by no means confined to the Tennessee Valley, nor indeed is the interest in TVA so confined. As Mr. Lilienthal says: "TVA is a demonstration, and one that can be readily

View from a Window

By DANIEL SMYTHE

Would that it were always like this:
Peace folded upon the windowsills.
Beyond them, the peaks are dressed
In a deepening purple glow.
One is so high its shoulder almost fills
The glass . . . And the vanished sun
Has left its mark upon the swells below.
The glass displays a world at rest,
All striving done.
Only the trees may creep
Into their shadows for the winds of sleep.

understood, of this truth: *in any perspective of time, unified resource development anywhere helps everyone everywhere.* A stronger, more productive Tennessee Valley region has benefited the whole American nation and all its regions."

The Valley and Its People: A Portrait of TVA. Text by R. L. Duffus. Illustrations by the Graphics Department of the Tennessee Valley Authority, Charles Krutch, Chief. New York. Alfred A. Knopf. 1944. 167 pp., including 108 photographs, pictorial map, and index to illustrations. $2.75.

TVA—Democracy on the March. By David E. Lilienthal, Chairman, Tennessee Valley Authority. New York and London: Harper and Brothers, Publishers. 1944. 248 pp., with 14 photographs on 8 plates, frontispiece pictorial map, annotated list of references, and index. $2.50.

Poems of Nature

The Wilding Heart. By Margaret S. Hosmer. Los Angeles. 1944. Hugh F. Brady Company. 139 pages. $2.00.

Margaret S. Hosmer has contributed several fine poems to the pages of *Nature Magazine*, and these and many others, both published and hitherto unpublished, go to make up this book. If we count correctly there are two hundred and fifty-eight poems in this little volume, Nature providing the inspiration for the majority of them. In contradistinction to some books of poems, which present a vast expanse of white paper and one little four-line poem on the page, the poetess and her publishers have made this truly a book of poems. Not only are the verses charming and, to our mind, good poetry, but the book is physically in tune with these paper-short days when decorative white space must be sacrificed to type.

Are You Woods-wise?

Wildwood Wisdom. By Ellsworth Jaeger. New York. 1945. The Macmillan Company. 491 pages. Illustrated. $2.95.

Here is a book both for the experienced woodsman and for those who may have had little experience in camping and living in the outdoors. Its author, who is no stranger to the readers of *Nature Magazine*, is Curator of Education at the Buffalo Museum of Science, but he is no armchair outdoorsman. Woodcraft has been one of his major enthusiasms, and he spends as much time in the wild as he does within the museum walls. In this book Mr. Jaeger has covered a wide range of subjects, including outdoor clothing; packs and packing; blankets and beds; shelters; fire making; use of axe and knife; outdoor sanitation and health; camp cookery and equipment; useful animals and birds; edible, poisonous and useful plants and trees; barkcraft; canoes, canoeing and portaging; trailcraft; stalking and calling animals; being lost; Indian lore; camp furnishings, and caring for one's self in the woods in winter. In fact, there seems little that he has overlooked. The text is liberally illustrated by many practical drawings by the author, drawings that support graphically the points made in the text. This is a book that should be read carefully and referred to often when one is planning a camping trip, and then should be carried along as a part of one's kit. Scout leaders and anyone having to do with leadership in the wild will revel in it, and it should be in the library of every outdoors-going individual.

—R. W. W.

South Pacific Birds

Birds of the Southwest Pacific. By Ernst Mayr. New York. 1945. The Macmillan Company. 316 pages. Illustrated by three colored plates and other figures. $3.75.

We do not know when a book more welcome has come to hand for attention. We have received many requests, in recent months, for reference to a book on birds of the South Pacific, such a book being desired for men and women taken there by the demands of war. There has been little one could recommend, for most books of this sort have been published abroad, often in foreign tongues, and about the only nearly satisfactory volumes for the area originate in Australia and are now hard to obtain. Now Dr. Mayr, curator of the Whitney-Rothschild Collection at the American Museum of Natural History, and Macmillan come to the rescue. Here we have a practical handbook, of use to the field student. It covers the birds of the wide area between Fiji, New Caledonia and Micronesia. One feature of the book is a helpful condensed summary of the present knowledge of the distribution, geographical variation and habits of the birds. Simple and most ingenious keys are worked out, and Dr. Mayr has done a splendid job in this respect within the limits of existing information about the avifauna of that part of the world. Obviously not as much is known of these birds as we know about our North American species, but with this book in the hands of service people in the southwest Pacific it may well be a stimulus to additional information. And Dr. Mayr's book is a "must" for anyone interested in birds of the southwest Pacific.—R. W. W.

Reptile, Not Mammal

Despite supposedly careful editing of the manuscript and several readings of proof, we let the duck-billed trachodon be described as a mammal in our January issue. We are sorry. Like once calling a spider an insect, it seems as though it is the obvious thing that often slips by. Anyway, it proves we are human.

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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great National Resources of America

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March Authors

Edwin Way Teale, who interrupts his *Nature Magazine* series on his insect garden to present an important discussion of DDT, needs no introduction to our readers. . . . Alexander F. Skutch, noted ornithologist and botanist, a native of Baltimore, Maryland, has made his home in Costa Rica for several years, and is an authority on the flora and avian fauna of Central America. . . . Raymond Tifft Fuller, writer-naturalist, lives in Winterton, New York. . . . Clarence L. Andrews, now living in Oregon, is an authority on Alaska, where he has spent many years. He is the author of several books and many articles on our northern territory, its history, people and wildlife. . . . Ivan R. Tomkins, who has been a frequent contributor to our pages, combines study of Nature with service in the U. S. Coast Guard. He is a combination of naturalist, writer and photographer. . . . George McClellan Bradt, currently a T-Sergeant in the U. S. Army, is a bird student and inquiring photographer of the avian world. . . . Hugh M. Halliday is a writer for the *Toronto Star* specializing in Nature and outdoor subjects with both pen and camera. . . . Hazel E. Nelson (Mrs. Walter F. Wolkenhauer) uses her maiden name to sign her cougar article in memory of her father, a great animal lover, whose enthusiasm she shared. . . . T. Swann Harding is information specialist in the United States Department of Agriculture and editor of the departmental publication *USDA*. . . . Winton H. Reinsmith is on the staff of the plant introduction gardens of the southern region of the United States Forest Service.

Jackson Hole

If one were to search for an outstanding example of a clear-cut issue that became a political football kicked around by misrepresentation and partisan prejudice, he would need to go no further than the Jackson Hole National Monument. This area, lying close to Yellowstone and Grand Teton National Parks, is essentially and geographically a part of these areas. Of the 221,000 acres involved, seventy-seven percent has been in Federal ownership for many years. Eight percent was in private or State ownership when this became an active issue in 1941. The rest, at the behest of President Coolidge, and with the later blessing of President Hoover, John D. Rockefeller set about to acquire for eventual gift to the people of the country. For fifteen years he paid taxes of nine thousand dollars a year on this purchased land. Naturally that was getting no one anywhere, so he asked that the area be set up so that he could hand over his holdings to the Government. Acting under the Antiquities Act of 1906, empowering a President to proclaim a National Monument, Mr. Roosevelt so proclaimed the Jackson Hole National Monument. In so doing he reserved to the owners of private lands, and their immediate families, all valid grazing and cottage rights, and other leases and permits now existing.

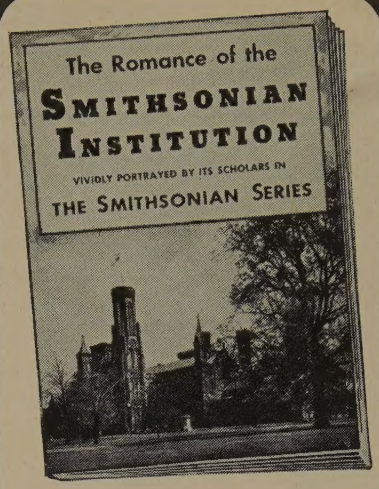
Such an action had long been urged by residents of Wyoming, including many of those who suddenly turned up in opposition to the Monument. There followed hearings, lies, false publicity, personal attacks and some of the fanciest misrepresentation on record. These combined to build a partisan issue in which fact and truth has no part so far as the opponents of the establishment of the Monument were concerned. For example, one California newspaper editor, who, if he is entitled to the title should have known better, opposed the Monument because, he asserted, its only purpose was to provide Secretary Ickes with a place where trumpeter swans could live unmolested. Such foolishness was multiplied on the floor of the House and Senate, party lines were drawn, and, largely unhampered by factual evidence, Congress passed a bill abolishing the Monument, and adjourned.

Mr. Roosevelt disapproved the bill with a pocket veto, saying that its effect would be "to deprive the people of the United States of the benefits of an area of national significance from the standpoint of naturalistic, historic, scientific and recreational values." He recognized the seriousness of a tax problem that the withdrawal of lands might create for Teton County, Wyoming, and expressed himself as sympathetic toward legislation that would adjust this matter and meet any other reasonable objections to the Monument.

Indications are that the attack will be renewed in the present Congress, but it is hoped that the case will be heard and decided on its merits.

Woodland Wonders

Particularly because we helped out in the matter of illustration, we were interested in a most attractively printed little booklet published by the tractor division of the Allis-Chalmers Manufacturing Company of Milwaukee. It is entitled *Nature's Woodland Wonders*, and its editor, Glen P. Burns, has done an amazing job of bringing together a group of oddities in trees from many parts of the country. His idea in concentrating on oddities, or freaks, in tree growth is that "everyone is completely aware of the intrinsic values of our forests both in war and peace," and that the strange in tree life is therefore especially interesting. We are not so confident that "everyone" is so sensible of the importance of the forest and its protection, but that does not detract from the entertainment and incidental informative value of this booklet.



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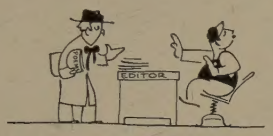
BELL TELEPHONE SYSTEM

Contents Noted

DESTINED, as we seem to have been, to read some four thousand original poems a year in order to select some sixty for immortalization in type in the pages of this journal, we are happy to learn of the formation of The League for Sanity in Poetry. In fairness to our contributors, successful and otherwise, we must say that the proportion of "insane" poetry that reaches our desk is small. Much of it is bad, but the so-called modernists among poets apparently have us clocked as an old fuddy-duddy who thinks that poems should rhyme, scan, have punctuation and be intelligible. We deny the fuddy-duddy part but admit to the rest. So we wish the League every success under its governing committee of Stanton A. Coblentz, Albert Ralph Korn, Lilith Lorraine, Etta Josephean Murfey and Lawrence W. Neff. And the address of the League is 358 West Saxet Drive, Corpus Christi, Texas, to which interested poets should write for information.



IN A recent editorial we said our ten cents' worth in favor of living and practical memorials to those who will not return from the wars. There is growing evidence that public opinion favors such testimonials, and that the majority have had their fill of marble monoliths and bronze statues. We should record, then, the existence of "Living Memorials," which offers a little brochure of that title upon request to 636 Southern Building, Washington 5, D. C. And, at 30 East Broad Street, Columbus, Ohio, is the headquarters of the American Commission for Living War Memorials. In cooperation with the National Committee on Physical Fitness of the Federal Security Agency it has published a stimulating 58-page booklet entitled "Memorials that Live." These are reassuring evidence of a trend.

OUR congratulations to the National Education Association on its publication of the booklet entitled *Education . . . A Mighty Force!* This is directed at the layman who wields influence in his community, and is predicated on the fact that it is its people that make a nation great. The nation's greatness, in turn, depends on how well the people are prepared to meet the social and economic challenges of today—and, particularly, tomorrow. Even a people as complacent as we are about our faults can no longer ignore the fact that 600,000 men—the equivalent of forty Army divisions—were rejected for illiteracy; that 360,000 men signed their first selective service registration cards by mark; that 56 percent of our population have only an eighth-grade education and 75 percent have not completed high school; that a large percentage of our teachers are grossly underpaid; that we spend more for beverage alcohol than we do for education. These are a few of the facts that this striking document presents. They are no occasion for pride. Our post-war expenditure for education must be doubled, otherwise we will have failed to learn another lesson from war.

IF YOU see a honeybee trembling all over, its legs sprawling and its wings awry, do not jump to the conclusion that it has been patronizing some local floral saloon. Actually it is suffering from a type of honeybee paralysis, which comes from a filterable virus that plays hob with many a hive. Dr. C. E. Burnside, Government entomologist, has been hunting for the cause of this illness. Making a water extract from some sick bees, he fed it, with drinking water, to a cage of healthy honey-gatherers. The majority of them became sick and died. The cause was confirmed by other experiments, and now entomologists are seeking preventive measures, the virus having been tracked down.

WE BOW in admiration to a man with the patience to ferret out a honeybee virus, or to spend years seeking the answer to the "Panama disease," which has wiped out uncounted acres of banana plantations in the past thirty years or so. We had not realized that for years this ailment had been forcing banana growers in Central America to move inland, clearing new land and leaving a wake of abandoned communities, much as logging towns in this country have been left after the timber has gone. A soil-borne fungus caused a wilt, in most places completely destroying the plantations. Scientists have now found that applications of certain minerals to the soil, plus planting and plowing in of legume crops, thwart the disease. Experiments for years, and up to 1935, were uniformly discouraging, but the research doggedly kept on until a solution was found, and promises the restoration of the banana production on a permanent geographical basis. R. W. W.

PHOTOGRAPH BY THE AUTHOR

Butterflies and moths both carry pollen from bloom to bloom, doing their part in the important job of fruit, flower and vegetable production.

DDT

The insect-killer that can be either boon or menace

By EDWIN WAY TEALE

On the shore of a lonely lake in the Adirondacks, last August, I sat talking with a man who had just arrived in camp. Dragonflies were sweeping back and forth along the water's edge. Wild bees hummed from flower to flower. Butterflies fluttered in the sunshine. And from the forest trees behind us came the medley of the songbirds. But the newcomer was oblivious to all this wildlife. He was bursting with news, news of a magic dust—the wonder-killer, DDT.

"If," he told me enthusiastically, "if the state will only appropriate funds after the war, this whole Adirondacks region can be turned into a vacationist's paradise. Airplanes could spray the area repeatedly with DDT. Every fly, every mosquito, every pestiferous insect from one end of the region to the other could be wiped out!"

And so they might. In the Pacific, the whole island of Saipan was given an emergency bath of DDT when the Americans turned it into an air-base. Afterwards, speaking only of mosquitoes, Brigadier-General Raymond W. Bliss, Assistant Surgeon-General, reported they were as scarce as four-leaved clovers. Near Scranton, Pa., last summer, an experimental plot of twenty acres of woodland was subjected to a DDT "bug blitz." A single dusting from the air turned it into an insect Sahara. It was weeks before six-legged creatures from the surrounding country began to seep back into the stretch of blighted woodland. There is no doubt about it, DDT has opened the way to wiping out insects over great areas. Given sufficient insecticide, airplanes and lackwit officials after the war, and we will be off with yelps of joy on a crusade against all the insects. Unless something is done to halt it, we are heading for a bug-blitz binge that will leave behind it a conservation headache of historic magnitude.

Certainly a nation that over-gunned the ducks, drained the swamps and then wondered why the game-birds were disappearing; a nation that started killing mother seals at sea, leaving baby animals to die of starvation by the thousands on the Pribilof shores, and killed to the last bird the myriad passenger pigeons; a nation that drained the Everglades and then was surprised at increasing fires in the area, because of the increased dryness, and at the fact that salt water was seeping into some of the wells; a nation that slashed the forests, turned prairie-land into a dust-bowl, hunted to extinction species after species—certainly that nation, on its record, cannot be expected to display much concern for the threatened disappearance of the insects. Yet, make no mistake about it, all the past monkeying with Nature's buzz-saw has produced nothing even remotely resembling the disaster that would attend the widespread and indiscriminate annihilation of these small and common creatures.

DDT—a name derived from the first letters of Dichloro-Diphenyl-Trichloroethane—is a compound introduced in 1939 by the 180-year-old dye and chemical house, J. R. Geigy, A.G., of Basle, Switzerland. The whole story of this potent dust is romantic and spec-

It is estimated that one hundred thousand species of wild flowers would be wiped out if honey bees were not on earth to perform their task of pollination. Predators are many among insects, maintaining the balance Nature has set. The robber fly at the right is one of these, catching and killing other insects. At first glance it looks like a bumblebee (left).

PHOTOGRAPHS BY THE AUTHOR

DDT has proved a boon to GI Joe. Here a buddy is dusting some of the powder down inside the shirt, where may lurk the cootie descendants of those that made doughboys scratch in World War I

tacular. It reached the market just in time to save the Swiss potato crop from the ravages of a newly-arrived army of Colorado potato beetles. Single-handed, it stopped in its tracks an epidemic of the dread typhus in southern Italy. In the Pacific, it wiped out local infestations of malarial mosquitoes. DDT, in one military emergency after another, has provided invaluable aid. It has proved itself one of the chemical heroes of the war. All this is true; yet, all this does not lessen its peacetime menace if wisdom is not employed in its use.

Unlike other insect-poisons, DDT is not washed away by rains; it remains active for weeks. Moreover, it is a two-edged weapon. It kills both by contact and as a stomach-poison. Just how it produces death is still something of a mystery. Flies walking across a sprayed strip of tablecloth begin to twitch, lose control of their limbs, have convulsions, and die. Because of the violence of the convulsions, one writer suggests that DDT might well stand for Double-Delirium-Tremens. Apparently, the higher nervous system is attacked. The same effects are noticed when larger doses are administered to fishes, frogs, and even to warm-blooded animals. Doctors of the U. S. Public Health Service have issued a warning that DDT may prove a health hazard and should be used with care. At this writing, government agencies are studying the possible effect of the poison on bird-life. The compound has no warning color or taste, and its toxic effect is cumulative—that is, within limits, small doses add up into larger and fatal doses within the body of the victim.

In the grand ballroom of the New Yorker Hotel, in New York City, not long ago, I sat with hundreds of entomologists gathered from all parts of the nation to hear a symposium on DDT. I listened to paper after paper. I talked with men who have been active in laboratory research and field experiment. The sum-total of what I learned seems to be this: DDT is still in the experimental stage. Much remains to be learned about it. It may prove, like radium and the X-ray, a blessing that must be handled with care. At any rate, when the compound is released for civilian use after the war, it should be subjected to rigid control and should be used only by those who know what they are doing. It is only fair to point out that the Geigy company has been prudent and careful in putting forth claims for its product. It is the unrestrained hyperbole of the press that has whipped up the idea that, once DDT becomes available in quantities, we can have a world free from pestiferous insects just for the asking

U. S. SIGNAL CORPS PHOTOGRAPH

Spraying an Arab hut in controlling malaria. It is also said that Arabs feel uncomfortable without their quota of fleas and lice, which yield to the insecticide.

PHOTOGRAPH BY A. DAWES DUBOIS

Mother wood pewee brings an insect lunch to her young. How lethal DDT is to birds eating insects dusted with it is one of the many undetermined facts.

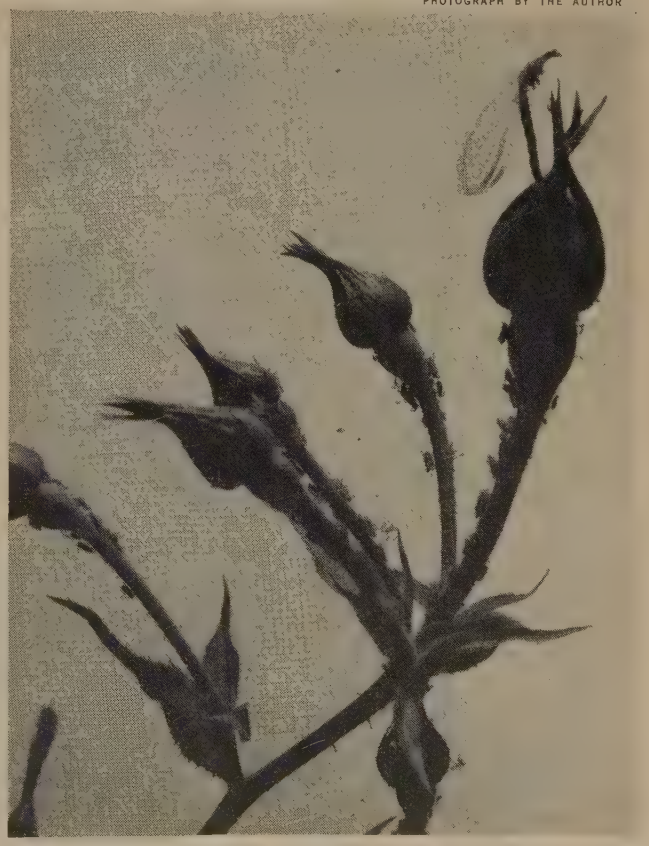
and without any after-bills to pay.

Ralph Waldo Emerson once visualized a perfected Earth as being a place without spiders. Those who, today, would remold the world nearer to their hearts' desire with DDT, visualize their paradise as a realm devoid of this insect or that insect. They cherish an old, old illusion. They still imagine—in spite of a thousand bitter lessons to the contrary—that they can pull out threads here and there from the fabric of Nature without otherwise changing the web. If, and where, DDT can be used to combat specific injurious insects alone, it is likely to prove of great benefit to agriculture. But where it is broadcast indiscriminately, cutting a clean swath of insect life, its potentialities for harm are immense. In other words, DDT must always remain a "rifle" weapon instead of a "shotgun" weapon. It must be aimed at a specific bullseye in its peacetime use and must never be turned loose on a countryside. Dusting a field or wood from the air will have all the judicious foresight of machine-gunning a throng of friends in order to kill a fleeing bandit.

There are, among the more than 625,000 species of insects known to science, only a very small percent that are harmful to man or his possessions. A few years ago, when the U. S. Department of Agriculture's Bureau of Entomology listed all the insects that were then preying on the men, the domestic animals and the crops from one end of the country to the other, that list had a total of only 235 species! That is less than *one-half of one percent* of the species known to entomology. Besides the well-publicized injurious insects, there are immense numbers that are working day and night to help us. They are fighting endlessly on our side. And they would be among the first casualties in any bug blitz.

One of the most obvious of these friends is the honeybee. During an average year, it supplies us, here in America, with more than 160,000,000 pounds of sweets. The beeswax it creates is a substance of such varied uses that, before the war, we annually imported as much as 5,000,000 pounds from abroad. Yet, neither the honey nor the wax represents the main contribution of *Apis mellifera.* Bees from a single hive will visit as many as a quarter of a million flowers in the course of one day. Humming from bloom to bloom, they carry the pollen that is vital to the forming of the fruit and the seed. Without honeybees, it has been estimated, 100,000 species of blooming plants would disappear from the face of the earth. So important are bees to fruit-orchards that colonies are rented and placed among the trees during blooming time, and several states have laws prohibiting the spraying of trees that are in flower. By enclosing two fruit-trees in insect-proof cages and liberating honeybees within one of the nets, a scientist in New Jersey has demonstrated that a well-pollinated tree will show as much as a forty-fold increase in yield. Yet,

PHOTOGRAPH BY THE AUTHOR



The lacewing fly preys upon aphids. It lays its eggs among the plant lice, and the young, immature lacewings, known as aphis-lions, devour large quantities of them. We can ill afford to have this system disturbed.

Apple trees in bloom attract many bees, flies and other insects, which carry the pollen from bloom to bloom. A tree that enjoys a sufficient number of bee guests has a larger yield. If these essential insects were wiped out by any unwise activity, it would be a considerable job for man to pollinate the apple blossoms by hand.

PHOTOGRAPH BY THE AUTHOR

honeybees would find the nectar-fountains at which they drink poisoned at the source wherever DDT was broadcast over the landscape.

Besides the honeybee, other insects are invaluable as pollinators. It is the long tongue of the bumblebee that perpetuates red clover. When red clover was introduced into New Zealand, it failed to produce seed until bumblebees were established there, too. This relation of bumblebee and clover is so well known that Darwin pointed out, in an often-quoted paragraph, that there is a direct link between old maids in a village and the yield in clover-seed in the neighboring fields—old maids keep cats; cats catch field-mice; field-mice are enemies of the bumblebees and where their number decreases the bumblebees increase and the red-clover flourishes. Such links run through the whole web of life. Yet, where DDT is turned loose on a large scale, the bumblebees, flies, butterflies, moths and other insects that pollinate the blooms of orchard, garden, forest, and field will be wiped out.

Besides the pollinators, there are infinite varieties of parasitic insects doing valiant battle in our behalf. Probably far more than fifty percent of all the insects prey upon other insects. Parasite-chains are numerous. An insect that preys upon another has a secondary-parasite preying on it, and it, in turn, has a tertiary-parasite dogging its footsteps. The insect world is a realm interminably divided against itself. It is held in balance by a vast system of checks and balances that keeps any one species from running amok. By planting immense areas to cotton, wheat, potatoes, and corn, we have ignored Nature's own system of diversified farming, and we have provided ideal conditions for the multiplication of such insects as the boll weevil, the chinch bug, the Colorado potato beetle and the corn borer. Under Nature's conditions, they never would have become important pests. With the application of super-insecticides on a wide scale, this upsetting of Nature's balance will be increased instead of diminished—for the predators and parasites, our invaluable allies, will be wiped out. Good and bad insects alike will go by the board.

In some instances, the good will go and the bad will stay. For example, in the Hood River region of the Northwest, orchardists who treated their apple trees with DDT discovered that, while they killed the coddling moths, the woolly aphis began multiplying at an alarming rate. The compound apparently does not kill aphids. But it had killed the syrphus flies, the lace-wing flies and the hymenopterous parasites, which normally keep the plant-lice in check. Similarly, an entomologist from Maryland told me that, from a distance, he could tell which trees in an experimental plot had been sprayed with DDT. They were tinged with brown as the result of the depredations of the red mites. These tiny pests also appear to be unaffected by DDT. In northern Ohio, a count made on the first of July showed that, whereas trees sprayed with lead arsenate had an average of one red mite per leaf, those treated with DDT had thirty. The super-insecticide somehow had upset the balance and a tremendous buildup of red mites had been the consequence.

Almost invariably unexpected by-products make their appearance when man tries to interfere with the balances of Nature. Textbooks on ecology are filled with examples. In our ignorance of the interrelationships of natural life, we are continually jumping from the frying pan into the fire. In Scotland, farmers banded together (Continued on Page 162)

A young male Montezuma Oropéndola on the day that he left the nest, aged about one month.

The nearest relatives of the birds in North America are orioles, grackles, bobolinks and cowbirds.

The Montezuma oropéndolas of a quiet Honduran valley build—

A Village in the Tree-top

By ALEXANDER F. SKUTCH

You who in May have surprised some shy bird with a straw in her bill, and waited quietly until she darted into the thicket where she was building and so revealed to you the nest, and then, returning often, have stood a self-effacing witness to all the pleasant duties of the pair, until at length the clamorous young were a-wing—you better than all others will understand the absorbing interest of watching the busy life of a colony of oropéndolas, centering around eighty pendent nests in the same lofty tree-top.

It was late in April when I returned to Honduras. The Montezuma Oropéndolas, *Gymnostinops montezuma,* were already well advanced in their nesting operations in the same tree where I had found them breeding the preceding year; for they flock each spring to the favored tree, as sea birds congregate from afar to lay their eggs and rear their young on the same barren islet where they themselves were hatched. The tall, smooth-barked nest-tree towered above an almost impenetrable thicket of low bushes and tangled vines that had overgrown an abandoned banana grove. On one side of the narrow strip of thicket ran a well-worn path that led to the thatched huts at the head of the Lancetilla Valley; on the other, beyond a little grass-choked rivulet, a hillside pasture rose steeply to the west. Its slope commanded an excellent view of the nest-tree, whose upper boughs were already laden with three score hanging nests, clustered near the ends of the twigs like great, gourd-shaped fruits. One unfamiliar with the ways of tropical birds would have been surprised to see a big, chestnut-colored bird with a bright yellow tail emerge suddenly from near the stalk of a seeming fruit, and fly with measured wing-beats toward the abrupt, forest-clad mountains that enclosed the narrow valley. In these nests the incubation of the two white eggs was still going on, or the young had already burst their shells and were crying loudly for food.

But a group of twenty-one oropéndolas, more sociable than prudent, had clustered their twenty-one great nests among the twigs of one slender bough. Everything had apparently gone well with them until many had laid and begun to incubate their eggs, when the branch, overladen with its heavy burden, had snapped off and come crashing down to the brink of the little stream. All this had happened a week or more before I arrived on the scene, to find the foliage already withered on the fallen branch, and the nests discolored by the water. Since, so far as I could learn, neither hens nor young birds had lost their lives in the crash, I was not altogether sorry about it; for it gave me an opportunity to study and measure the otherwise inaccessible structures, and to watch the dauntless birds as, with unabated zeal, they set about to prepare new cradles for their nestlings.

The female oropéndolas built their nests with no help from the far bigger males. Through most of the day they worked with tireless industry. Among the materials they used were long, pliant fibers, which their sharp, orange-tipped bills ripped from the undersides of the stout midribs of the great leaves of the banana plants growing in a neighboring field. I tried more than once to surprise them at this activity; but a vigilant male nearly always accompanied a

The great swinging pouches of the oropéndolas range from two to five feet in length. The entrance is at the top and it always faces outward from the tree.

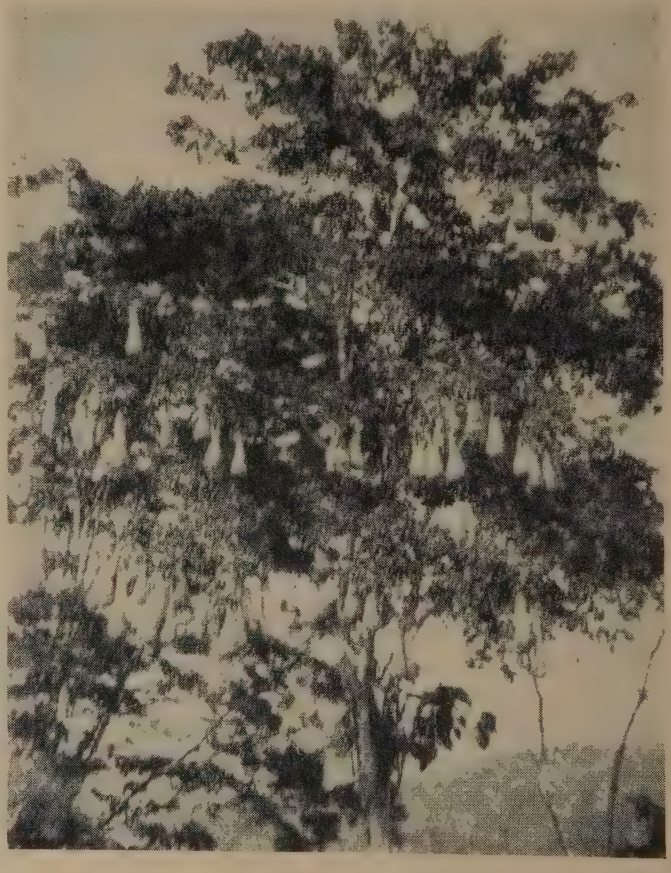
party of hens on their excursions to gather material, and his loud *cack* of alarm invariably put them to flight as soon as he saw me.

With long strands of fibrous material for her nest streaming behind, the female oropéndola returned to the nest-tree with labored flight. Upon reaching the tree she might take a short rest, but soon she went to the forked twig that would support her long pouch and twisted and knotted the fibers around it, to form a firm and stable attachment. When this anchorage for the future nest was sufficiently strong, the bird forced apart the tangled strands, using her whole body for this purpose, until they formed a loop in which she could sit as she continued to weave. Now on each return with new strands she would perch in the loop, always facing the center of the tree, until a lengthening sleeve was formed, in which she would hang, head downward, while she wove at its lower margin. Presently the nest became so long that only her yellow tail was visible projecting through the doorway at the top, and her head could be seen as at intervals it pushed forth from the open lower end. Finally her handiwork was long enough to contain the whole oropéndola; and after the rounded bottom was woven in, I could catch, through the field-glasses, only an occasional glimpse of the sharp orange tip of her bill protruding through the side of the nest, as it pushed and pulled additional fibers through the close-meshed network of the fabric—a deft weaving job.

In addition to the fibers from the banana plants, the oropéndolas gathered for their nests many slender green vines with leaves attached, and long, narrow strips torn from the fronds of palms. Such was the patient application of the birds that these great swinging pouches, from two to five feet in length, were completed in an average time of ten days. One bird, in a particular hurry to be finished, completed a somewhat shorter nest in eight days; while another, who blundered much as she began her work, required twice that period.

The construction of the nests did not proceed without a good deal of discord between the laboring female oropéndolas. In many instances two nests were begun so close together that the builders were mutually in each other's way as they worked, and they paused to express their annoyance in loud, high-pitched, irritated voices. Else, losing temper completely, they menaced each other with open bills, and, meeting face to face in the air, came fluttering earthward until their proximity to the foliage below warned them it was time to cease this aimless dispute. Then they separated and flew up to continue their weaving side by side, as though nothing had happened between them. But what surprised me more in these usually so orderly, industrious birds was the frequency with which they stole each other's nest-material. A building oropéndola could rarely resist

This prosperous colony of oropéndolas in Honduras contained eighty-eight nests, hanging like gigantic fruits from the tips of the branches of the nest-tree.



In the heart of the oropéndola colony. Two nests are sometimes built in such close contact that they are sewed together by the birds as they weave. An oropéndola rests in the center of the group of nests.

the temptation to snatch a fiber that hung loosely from the unfinished nest of a neighbor, to incorporate it into her own. Sometimes, when the upper end of such a fiber was attached more securely than she reckoned, the would-be thief, grasping it tightly in her bill, hung with half-closed wings beneath the nest until the coveted strand gave way, or the legitimate owner returned to drive her off. In the end, I think, this habit of pilfering must have been somewhat beneficial to the colony, for it discouraged careless, slipshod work; those individuals who wove most carefully and left few loose strands were not often molested by thieving neighbors, and finished the stronger nests.

But the effrontery of these robberies did not end here. Often, returning with long banana fibers trailing behind her, an oropéndola paused to catch her breath on a neighboring bough before going to the nest to continue her weaving. On seeing these strands depending from the bird's bill, a second female, perhaps just preparing to go afield to gather more material for her own nest, would change her plans and grab one dangling extremity, then, hanging from it with nearly closed wings, do her best to pull it away. The utterance of one single note of protest to her shameless rival would have been disastrous to the rightful owner; for to open her mouth, as the raven in the fable when he succumbed to the flatteries of the fox and began to sing, would have resulted in the loss of the whole cheese! The situation was so ludicrous that at times I could not help laughing aloud, at the risk of alarming the birds. But the oropéndolas were too industrious to waste much of their time in pilfering or quarreling, and weaving proceeded apace.

The male oropéndolas, as big as crows, were a third larger than the females, which otherwise they rather closely resembled. There were several females to every male, so that polygamy of necessity prevailed in the colony. While the hen birds labored assiduously at their nests, the big males strutted about the nest-tree with heads held high in pompous idleness. Or else they made gallant advances to the females, who were at the moment far too completely absorbed in their important tasks to be aware of such unessential presences. At intervals they voiced their far-reaching calls. Bowing profoundly, until his raised tail stood directly above his inverted head, spreading his wings until they met above his back and ruffling all the feathers of his body, the male oropéndola would utter, or rather seem to force out with heartrending effort, an indescribable liquid gurgle. Heard from afar, there is no sound, save possibly the distant call of the short-billed pigeon or the melodious wail of the tinamou, which is to me more expressive of the mystery and the wonder of the lowland forests of Central America. Close at hand the effect of the oropéndola's call is somewhat marred by screeching overtones, as though the machinery that produces this inimitable music were badly in need of lubrication.

The male oropéndolas were also the watchmen of the flock. At the approach of danger, real or fancied, they uttered a sharp, harsh *cack*, which often sent the whole colony headlong into the shelter of the thicket beneath the nest-tree. It was extremely difficult to elude the keen eyes of these sentries.

After the outer fabric of the nest was completed, the female oropéndolas neglected their structures for a day or two. This was probably the period of their honeymoon with some attentive male, afar in the forest. At least, there was never any actual mating in the crowded nest-tree; although the male birds displayed often while in the vicinity of the nests, their deep obeisances were as a rule directed toward the world at large rather than any particular female of their kind. After this interlude, the females would

return and work assiduously for several days more, bringing pieces of dead leaves into their nests. These formed a yielding litter in the bottom, and apparently served to prevent the two eggs' rolling together and breaking when a wind rocked the swinging pouch.

A bustle of activity prevailed in the nest-tree at the height of the breeding season in May: the female oropéndolas hurrying back and forth with fibers or food for the young in their bills, or clucking as they paused to rest among the branches; their not infrequent quarrels and high-pitched remonstrances; the male birds strutting along the limbs or flying with resonant wing-beats from one to another, often repeating their liquid calls; the whining cries of the nestlings rocked in their lofty cradles; the voices and movements of birds of many other kinds that came to the nest-tree to seek food or to rest.

Whenever a lurking giant cowbird, *Psomocolax oryzivorus*, appeared among the nests, things moved with an even swifter tempo. So long as there were any nests in which incubation of the eggs had not yet begun, these big, black, red-eyed, parasitic birds continued to haunt the nest-tree, the females paying furtive visits of inspection to the finished pouches, the larger males waiting near by and from time to time voicing an unlovely, spluttering screech. Of all visiting birds, save, of course, dangerous raptors, their presence alone seemed to be resented by the oropéndolas. Continually chased by one and then another of the bigger yellow-tails, the cowbirds circled and doubled and returned with undaunted persistence, until at last one contrived to elude many watchful eyes and slipped into an unguarded nest, where she left an egg to be incubated by the oropéndola. The cowbird who finally succeeded in foisting her future offspring on a foster mother had not only to dodge the watchful oropéndolas, but also found it necessary to outwit jealous rivals of her own species, each eager to drop her own egg into the newly-finished nest. Had the oropéndolas made a concerted attack upon these unwelcome intruders, they might have driven them far from their nest-tree; but they were mild-mannered birds and seemed content merely to prevent their entry into the nest, rarely continuing their pursuit for more than a few yards from its doorway.

Once incubation had begun, I could only surmise how things were going in those close-woven baskets so high and inaccessible. Often an idle male oropéndola would jump heavily on the side of a nest and hang there, head downward, to deliver his loud call, while from within came the protesting whine of the annoyed female. But at length there came a day when I saw one return to the nest with some morsel of fruit she had gathered on the distant forested slopes, and I knew that her nestlings had escaped from their shells. Then, day after day, she continued her tireless journeying between the nest and the fruiting trees in the far-off mountain forest, until at last her nestlings grew feathers and could fly with her to the sources of food.

The ever-active female oropéndolas would continue their daily tasks even after the sun had fallen behind the western mountain rim. As dusk descended over the quiet valley, they would weave a last strand into an unfinished nest, or bring a final mouthful to the waiting nestlings. Other members of the flock would perch among the boughs of the nest-tree, enjoying the refreshing cool of evening after a strenuous day, the female birds clucking in contended tones, the males often bowing low as they uttered their liquid gurgles. Then, in little groups of several together, the males, and those females who had neither eggs to incubate nor tender young to brood, would fly off northward to their nightly roosting place on a wooded hillside two miles down the valley. Finally, as the tree-frogs began their shrilling, and the loud yet soft *kwah-reo* of the crepuscular pauraque heralded the approach of night, the last lone male oropéndola jumped heavily to the side of a nest to bow and call, then hurried with sonorous strokes of his wings to overtake his companions. When he had gone, the remaining females entered their nests one by one, to cover their eggs or callow young, and rest from the prolonged labors of the day. The older nestlings slept alone in their secure cradles until the mother returned with food for them at dawn. Every oropéndola that remained in the nest-tree during the night was inside a nest.

The nestlings lingered in their lofty nests about four weeks, a period unusually long for a passerine bird. During all this time they never received a morsel of food from the males, who at most would come to stand above the nest and peer down at them with head cocked to one side. Early one misty morning, I saw a fledgling climb to the top of one of the long pouches and look out with (Continued on page 162)

Have You?

By ETHEL ROMIG FULLER

Have you chanced to wonder
What the world were like,
If the feathered Brotherhoods
Went on a strike?
If, till hours were shortened,
Thrushes, summer-long,
Meadow larks, and bobolinks
Refused to trill a song?
If not one goldfinch fluted
From a roadside thistle?
If, in the dark, was never
A white-crowned sparrow's whistle?
If orioles demanded
A week-end holiday?
And the warblers, for over-time,
An increase in pay?
If vireos scorned pleas of
A harassed Labor Board?
If delegates of phoebes
"Waited on the Lord?"
Have you chanced to wonder,
Did birds go on a strike,
What an apple orchard,
A wooded hill, were like?

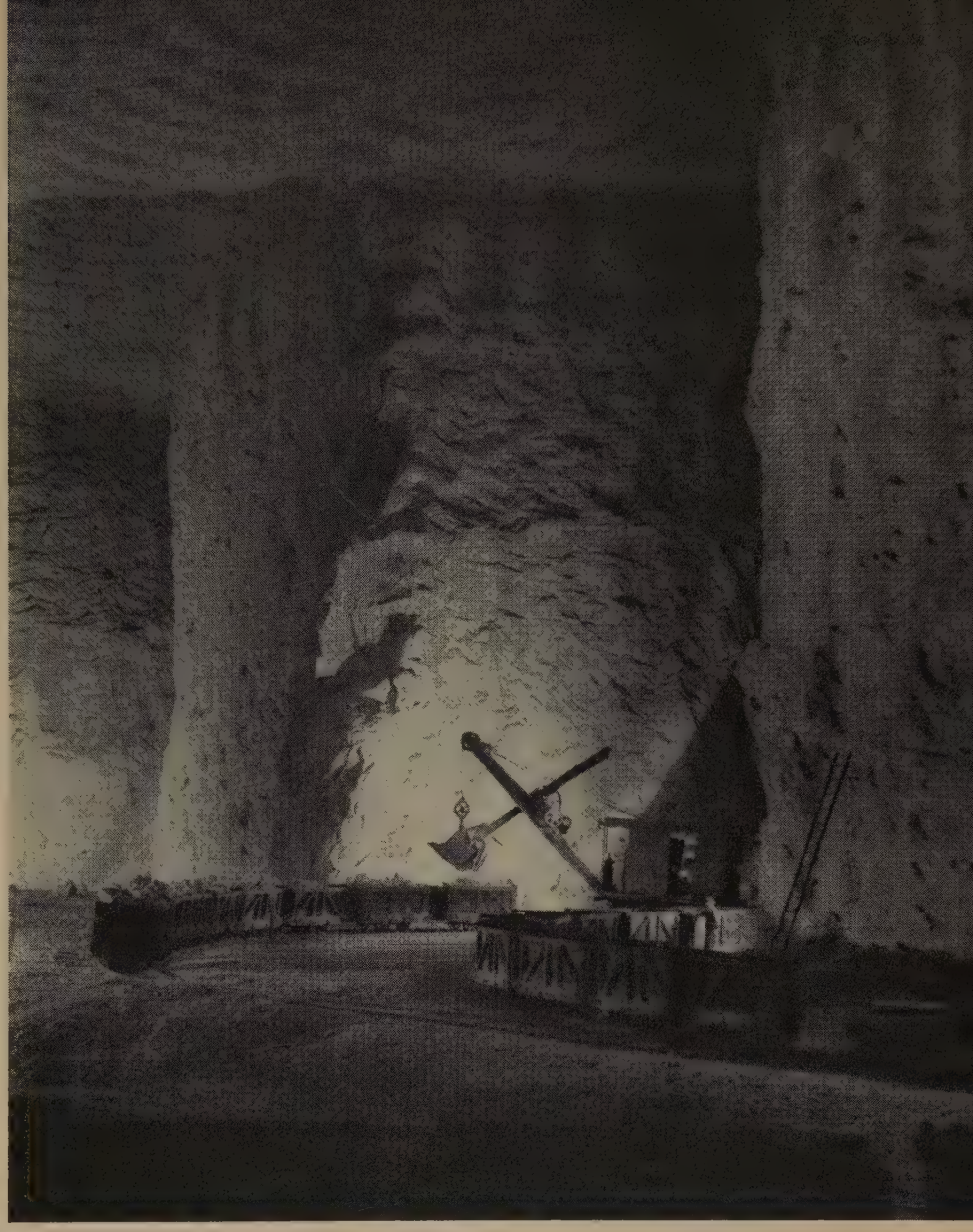
Salt of the Earth

By RAYMOND TIFFT FULLER

★

High above, groined arches of giant cathedrals leaped across to reproduce the Gothic curve; vaultings above the mightiest of naves.

★



Not long ago I went down into a salt mine, and I shall not forget what I found there. It was a Louisiana salt mine, down on the very rim of the Gulf; a place where one would not expect any sort of mine would be. Yet this is the region where men also "mine" sulphur and "mine" petroleum; why not salt?

It is the oldest known salt mine in America; probably the largest, almost certainly the purest and the deepest deposit of rock salt known to man. Down in the mine the temperature never varies from 70°, year in, year out. It holds more salt than man as a species can ever consume. It is an immense dome of salt covering at least two thousand acres. No man knows how far down it extends, for drillings have not yet succeeded in plumbing it. Twenty-four-hour production has come again to this Avery Island salt mine because unlimited amounts of brine have become suddenly necessary for the newest "cracking process" used in producing high-octane fuel for our vast war effort; the mine has had its openings and its closings often since 1800. Yet such facts were not what most impressed me.

There are only three important ways we can get salt commercially—from sea water, from salt springs, from mines. This place at Avery Island (not an "island" but a hogback on a plain) in Louisiana is a mine, and the stuff that is mined is handled just about as is anthracite around Wilkes-Barre, Pennsylvania. But the *result*—that is what amazed me on this salt mine visit, and held me spellbound for more than two hours as I gained knowledge of a salt mine.

"Possibly interesting," you may respond, "but what has this man-made object to do with Nature; is a mined mine a natural thing?" Well, I take it that a dug mine is as natural a phenomenon as an eroded canyon, a deep-rutted Tennessee hillside, or a water-worn cave. Water is only one of many eroding agents; and when the man-animal starts eroding rock salt at a rate of around two hundred tons per hour, the result is bound at least to show. And show it does! If you permit me to take you down five hundred fifty feet into solid rock, perhaps I would be able to explain how the electric age has dealt with the very salt of the earth.

The big square, unlighted box of an elevator began to descend. Two men went down with me; that is to say, they were alongside me when the gate closed, and when it opened five hundred fifty feet below. But I did not see them en route; nor hear them. If there be solid darkness on this globe it is in a mine shaft; darkness plus stillness and strangeness—stillness utterly if the hoist be well-oiled, as this was. Absolute

blackness—one wants to say *velvety* blackness—yet that odd, slightly acrid, seashore-like smell that I detected did not connote velvet. Visceral sensations told me we were descending slowly. Seconds, which could easily have been minutes, went by. All at once, below, is an eerie light, such as steals in through the frosted chamber window in the Adirondacks at eight of a Christmas morning. There is crusted frost everywhere; first glowing from below, then all around; white, as though we were sliding deep into a titanic snowdrift.

A sudden flash of a line of naked electric bulbs along a huge corridor did suggest a mine gallery; but a gallery in a mine the like of which I had never imagined. The "bowels of the earth" should not be *white*, yet every inch, white as alabaster, sent back a million dull sparkles from the crystalline stuff that housed us roundabout. I stepped forth. My companions ceased to exist for me; I was enchanted into speechlessness by what I beheld; wonderingly stroked with my hands these mysterious, vast, leaping walls. Salt; there was nothing anywhere but salt!—NaCl—rock salt—98.3% pure—hard—jagged—quartz-like.

Under foot was the granulated, clean, dry, waste salt of the "floor," like seabeach sand. But the air here held no humidity; it was like noon on the Sahara. And how warm down in this mine—ten degrees warmer than up where the sun was shining. The crunchy floor stretched away, everywhere flat and level; the walls perpendicular. High above, groined arches of giant cathedrals leaped across to reproduce the Gothic curve; vaultings above the mightiest of naves. White curved against white; one wondered where wall ended and ceiling began? It was fifty, sixty, seventy feet above, someone said later, although one could not have estimated on the spot.

Suddenly I realized I had not yet moved ten feet from the elevator shaft, so I started on. Whiteness and silence began taking the form of an enclosing atmosphere, a world like the blankness of the ether-drenched tent over your face in the operating-room. The whiteness was brighter and more shining near a light-bulb, thinning to duller white as one glanced aside. I moved along the great white corridor, hearing nothing except, far off, a rattling as of mighty chains, and, most faintly, a burring, buzzing noise, distant and unplaceable. Abruptly I came to where the corridor forked into three; where lights were slightly aggregated. Thereby the high-above, dim, religious light brightened perceptibly, and what I made out was that now I stood, a dwarf, a mime, squarely before a titanic twin-proscenium whose backdrop was a place where three gigantic columns supported a triple-arched dome. Gaping recesses led to left and right. If there were dimensions to this stage they could not be grasped. But if one shaded his eyes and paused, he imagined he could detect, far off to left and right, majestic avenues filing away down between white tree boles whose mighty branchings melted into utter darkness far above. A gargantuan stage, this! And down those side entrances, those vast catacombs, which could be the runways giant dinosaurs inhabited, what prehistoric things were in fact still there, what troglodytes, what antediluvian dragons pulled at chains and hoarsely breathed, roared and hissed!—For such sounds I heard.

I inched along down the vast cloaca leading to the left (along which a giant could carry a pine tree), where "rooms," mined rooms, opened off on either side alternately, hollowed out by man and his tools decades ago, or generations ago; cubical *black* caverns—"caverns measureless to man"—which imagination could only magnify. "Oh, Hollywood," I thought, "why have you never discovered all this; there is absolutely nothing like it anywhere in, or under, the world! What a setting for the most exotic plot ever conceived!"

It is true that, after a while, I did discover railways carrying creaking strings of loaded cars; great electric shovels gnashing and scooping; busy men boring with drills and blasting with dynamite; undercutting power saws whining and vertical saws splitting; endless bucket chains lifting salt up to the light for twenty-four hours every day. And I saw how people a thousand miles away got rich and kept getting richer because of these practical operations. When I try to imagine how, and when, and upon the floors of what geologically ancient lakes such mighty salt beds had evaporated, I cannot. I cannot guess whence that salt first came to be in such waters. Are the planet's oceans growing ever saltier, or are they less so than before such salt domes as this were laid down? Down in this awful abyss of the primeval, in what are probably the vastest hollows man has made underground, the ultimate purposes of Nature are veiled even more fully than among the bees and flowers above!

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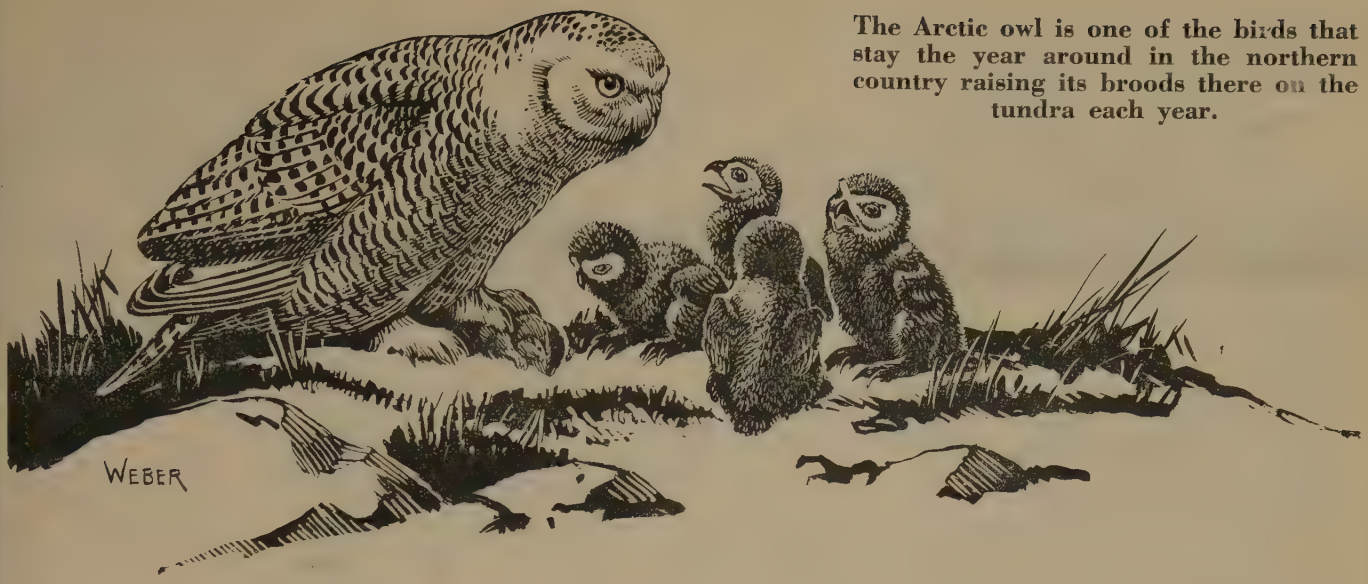
Travel Note

By NORMA T. STEWART

Parameciae are rather funny things,
They have no feet, nor fins, nor wings;
They have a lot of whips, which they lash to and fro;
And that's how they get to where they want to go.



The Arctic owl is one of the birds that stay the year around in the northern country raising its broods there on the tundra each year.

Some Birds That Nest in the North

By C. L. ANDREWS

Illustrated by Walter A. Weber

In northern Alaska, along the shores of the Arctic Ocean and including the Valley of the Yukon, is a vast, sparsely-settled land, the summer home of myriads of birds. A few of the feathered dwellers—including the ptarmigans, the great white Arctic owl, the redpolls and a few others—make their home there throughout the year, but the great majority wing their way southward as soon as winter encroaches on the land, and closes the streams and lakes.

This northland would be filled with millions more avian summer visitors, busy rearing their families, were it not for the thousands of gunners who shoot them in their passing, some simply for the fun of seeing them fall. From the time the birds leave their northern lakes on their southern flight —some of them bound for the very antipodes — until they return the next season, they face a continual ambuscade. Danger lurks in every pond and tuft of bush or grass. The number that return to the breeding grounds decreases yearly. Lakes where migratory waterfowl congregated, rested and sported in uncounted numbers fifty years or less ago are today sparsely tenanted by comparison.

The air on the tundras is often filled with the notes of the Alaska longspur.

When, in 1865 to 1867, the scientific corps of the Russian extension of the Western Union Telegraph Company worked in this northern country along the line of their projected adventure they found, listed, and brought out more than two hundred different species, some of them new to science or to North America. Notable among these workers was Robert Kennicott, who died on the lower Yukon in 1867. He had worked in the Yukon valley in 1860, accompanied by members of the Hudson's Bay Company whom he had inspired in natural history.

Especially noteworthy among the northern summer residents are the waterfowl and marsh-breeders—swans, geese, ducks, cranes, sandpipers, phalaropes, plovers, jaegers, gulls. Among the land birds are Alaska longspurs, hawks and owls of different varieties, ravens, ptarmigans, grouse, robins, thrushes, rusty blackbirds, snowbirds, sparrows, warblers, and others.

The snowbirds, or snowflakes, are the first of the summer tribes to arrive. In the valley of the Yukon they appear about the first of April, and soon afterward they are found along the shores of the Arctic as far north as Point Barrow. How they make their way over the snowfields, and how they find a livelihood is one of Nature's mysteries. At Barrow it is May 30 before the tundra appears from under its winter coat. The snowbird prepares for its summer home as soon as it arrives, choosing a sheltered place under the overhanging snow cornice of a shelving bank, or behind

Many shore birds are summer visitors to Alaska. Here are a pair of pectoral sandpipers, a red-backed sandpiper, two northern phalaropes and a single least sandpiper.

the sods that cover an Eskimo igloo. Before the snow is gone the young are ready to fly. I once found one of their nests in the skull of a whale that lay on the shore. The birds had entered through a tiny hole and had made a cosy home in the sheltered hollow, safe from marauders.

As soon as the bare spots appear on the tundra, and enough water forms in puddles to afford a landing place, the ducks, geese, and cranes appear. The first of the ducks are the eiders—king eider, spectacled eider, and Pacific eider. They come flying over the lead, or crack, which, about the middle of April, opens in the ocean ice in nearly a straight line from Point Hope to Point Barrow and out into the Arctic Ocean. Along this lead a warm current flows at about two or three miles an hour. Above it the eiders fly, alighting as rest is needed and traveling along on the stream. In the warm water that comes from southern seas, and finds its way through Bering Straits, the bowhead whale passes to its northern feeding-grounds. The eiders (the spectacled rarely) go on toward the east and northeast, to various points beyond the Beaufort Sea, spreading out among the great cluster of islands that lies north of Canadian territory. There they nest and rear their young. In the fall the drakes leave early, flying south and west to the Alaskan shores, then around Point Barrow and down the coast. Later the ducks fly down with the young, forming long lines just off the shores, leisurely working southward.

From the great flocks of the northward flight, stragglers drop out along the way when they see land appearing through the snow fields, and there they tarry to build nests for summer homes. The four kinds of eiders—king, spectacled (rare), Steller's (rare), and Pacific—are found in little communities from the mouth of the Yukon to Barrow and the Mackenzie, and the common ones go even farther.

Following these are the black brant, and the white-fronted goose, which is found as far north as Barrow. The Emperor goose seldom goes above Kotzebue Sound, and the Canada goose is not frequently to be seen above that sound. The snow goose, however, flies as far and nests as far as land extends. A hundred years ago the Canada goose nested on the bluffs of the Porcupine River, which comes into the Yukon at Port Yukon. This was recorded by Murray in his *Journal of the Yukon.*

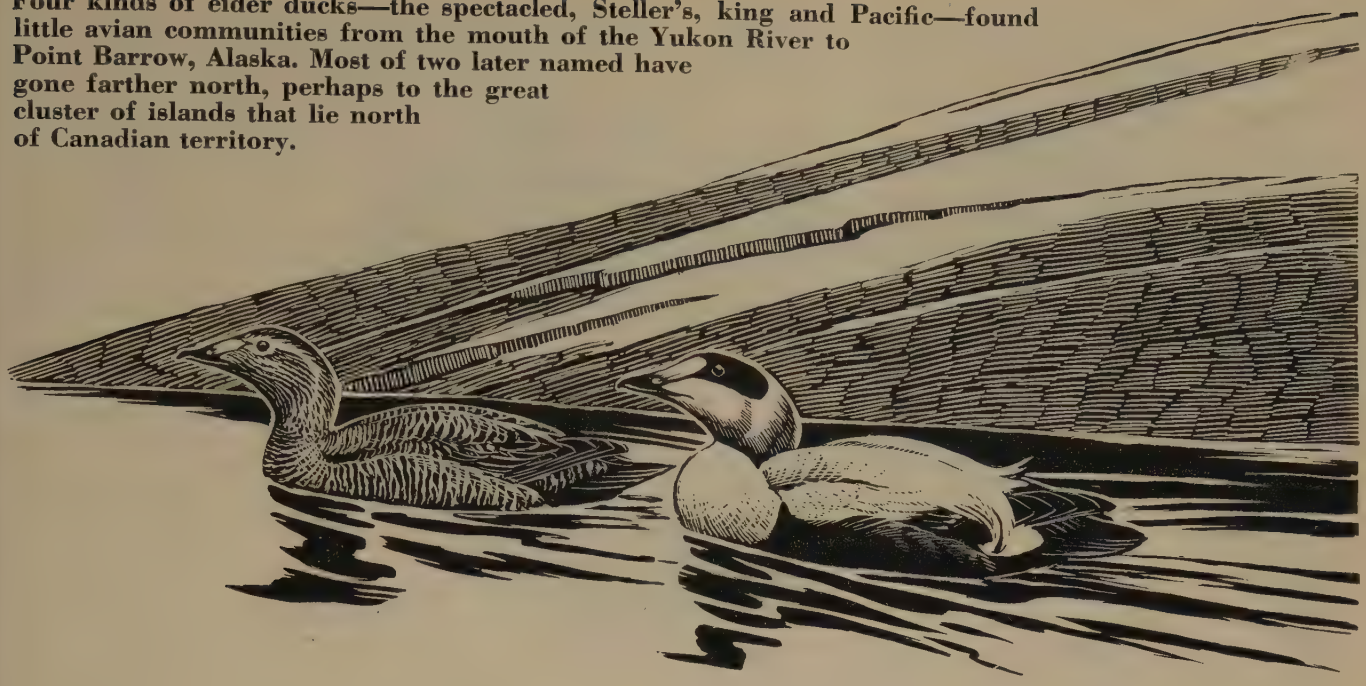
The pintail duck and the old squaw go as far as Barrow and beyond. The redbreasted merganser, the baldpate, and the pintail are plentiful, or formerly were, on the Kobuk and other rivers that enter the Kotzebue Sound. The green-winged teal, the mallard, and the scaup, as well as the scoters, are found as far north as the Kotzebue, but the first two are rare. An occasional harlequin duck is found in the region. The whistling swan is not common but sometimes goes as far as Barrow or beyond, as does the little brown crane.

Both the golden and the blackbreasted plovers are found all along the northwestern coast, but are scarce on the Seward Peninsula, where they were formerly plentiful. Far up toward Point Barrow I passed along the sandy strip between a lagoon and the ocean. In the scanty grasses of the reach I saw a golden plover slipping slyly away, trying to elude observation. I knew that meant a nest near by, and I soon found it secreted under a tuft of grass, filled with beautifully mottled eggs.

Among the watery canals of the marshy margin of a little lake a colony of black brant had taken up claims and established residence. Their nests, each with four or five white eggs, carefully concealed by a coverlet of down plucked from their breasts, were among the rank grasses that overhung the canals.

In the tufts of coarse, wiry grasses on a dry knoll

Four kinds of eider ducks—the spectacled, Steller's, king and Pacific—found little avian communities from the mouth of the Yukon River to Point Barrow, Alaska. Most of two later named have gone farther north, perhaps to the great cluster of islands that lie north of Canadian territory.



were the nests of sandpipers and phalaropes. Four kinds of sandpipers were seen—the western, red-backed, least, and pectoral. Of these the strangest and most interesting is the pectoral. It has a sac under its throat, which it inflates as it utters a booming note. This bird nests in June and July, and by the last of September all are gone southward.

Two phalaropes, the northern and the red, are to be seen, the former most plentiful on Kotzebue Sound, the red farther north. They come as soon as the snow disappears and are breeding by the first to the tenth of June. The phalaropes are peculiar in that the female is the richer in plumage, and that she is the love maker, pursuing the male in long sweeps and circling tirelessly until she captures him. The Eskimo call the bird *lil-li-a-war-ook.*

The willow ptarmigan remains throughout the year, retreating to the willow thickets during the coldest months, then coming out to the open tundras as spring returns. It makes its nest snugly among the tall shoots of coarse grasses on the drier ridges. In it are laid about eight beautifully marked eggs, mottled and colored from a yellowish-brown to a deep maroon. They are almost undistinguishable from the dry grasses and the dark earth, blending with either. An Eskimo girl piloted me to one of the nests. The native's eyes are as sharp in finding the nests as the birds are shrewd in concealing their treasures.

I saw but one flicker in my stay in the far North. Indeed, there are so few examples of tree growth there that it is strange that this bird wanders so far. Some Eskimo boys came to me one day with a specimen they had killed, mystified because they did not know what kind of bird it was, and they had no name in their language for it. The bird was found some fifty to one hundred miles toward the mountains from Wainwright. There the willows are as high as one's waist, and it is more than one hundred and fifty miles across the Brooks Range in an air-line to a real tree. When the skin was sent to Dr. Heath of Stanford University, he pronounced it a new variety. Its kind surely must not nest farther north than the Noatak Valley.

On the rocky promontories and the craggy pinnacles in front of the steep bluffs and headlands, the kittiwake gulls and murres (here called crowbills), as well as many other of the sea birds, make their homes. The eggs of the murres are kept from rolling off the narrow shelves by their sharp cone-like ends, which cause them to roll in a semicircle instead of plunging off the precipice into the sea. The rows of white-breasted erect murres, with their black wings and white breasts, resemble rows of white-shirted men in seats at the theater.

One of the most interesting of the summer visitors is the sickle-winged Arctic tern, which goes to Antarctica for its winter vacation. The farthest south rookery of this species that I have found is in Taku Inlet, a branch of Stephens Passage in southeastern Alaska below Juneau. There, among the boulders and gravels of the moraine of the Norris Glacier, are nests of these terns. I once went to make a camp on the moraine, and left part of my equipment with a boy to guard it. When I returned, I found that the terns had driven him out of camp. I had placed it too close to their eggs.

Up in the banks of the Kobuk River, which winds three hundred miles inside the Arctic Circle, the bank swallow burrows into the bluffs to nest. On the banks of the Yukon, at Eagle, Alaska, the barn swallows mix their mortar, to construct their dwellings under the eaves of the most northerly customs post in the United States territory.

The sparrow family is (Continued on page 164)

The adult *Siren* was about two feet long, two inches in diameter, and with outside gills and two feet, up close to the head. Little is known about its life habits. It is, as an adult, light gray, the sides being not as dark as the back, and it is marked by inconspicuous yellow dashes and blotches.

There are few true amphibians, at home in water and on land, but one such is—

The Siren Salamander

By IVAN R. TOMKINS

SOMEONE once wrote, "The variety of the universe is infinite."

No matter how well we may think we know any small plot of ground, there is likely to come a time when we will find some strange and unusual creature that has lived there much longer than we. More of the interest falling to the lot of the amateur naturalist comes from discovering some of the things that live within his own circle, than in the thrills of finding things new to men far beyond the usual horizon. We cannot all travel to foreign countries, although many are doing so today in the grim business of war. For Nature exploration, however, most of us must be content with the "foreign countries" of our own backyard. Such a local "expedition" produced my first acquaintance with the siren salamander, *Siren lacertina.*

To most of us this is only a name, something put in the textbooks along with the axolotl of Mexico. So it was to me, until one very dry winter helped me to meet the creature itself.

Amphibian is a word used to designate a group of creatures—frogs, salamanders, and the like—which live both in and out of water. If the word were strictly applied, there would be few animals in our world today that could qualify, for most of those within this class cannot live indefinitely in both media, or in either. An acquaintance, even if slight, with a creature fully equiped with both lungs and gills when adult, and able to use either as occasion demands, is worth putting down.

All that winter it had been dry, and all the rainwater ponds were empty. Back in the woods was one favorite pond of mine, and this was so dry that the pond vegetation had been burned from the surface, the result of some small woods fire. Two different years in spring, I had found Wright's frog, *Rana hecksheri,* in this pond, so it was usually visited whenever convenient.

One day in early February was warm and pleasant, and it was about time for our earlier frogs to be gathering for the spring courtship. All that was lacking was rain, but I visited the pond anyway. It is located in about the northern limit for Wright's frog, so anything that could be found out about it was profitable, for me at least.

On the partly-dried surface of the pond bottom there was a crevice in the moist muck. In it was something black, which looked much like two catfish lying side by side. When dug out it proved to be only a

single salamander that had been doubled back on itself. It was about two feet long and perhaps two inches in diameter—an exact measurement was never made, because it was so squirmy.

The first thought was of *Amphiuma,* the "Congo Snake" (*Nature Magazine,* November, 1944) of the rice fields ditches, but that amphibian has four weak legs with two or three toes, while this one had only two legs, close up by the head, with four toes each. There was a second one, likewise lying in a crevice, but the fire had burnt it badly, and as there was a chance to carry home only one, that one was left. When I put it in the aquarium at home, I soon realized that I had acquired an unusual creature, one of the very few in the world that possesses both lungs and gills when adult.

The siren had lain there in its niche over the long period of dry weather, without food or water, breathing air through its lungs. But it was ready, whenever the rains came, to become again an inhabitant of the muck of the pond bottom, and again to get oxygen from the water by its gills.

When it was brought in from its long stay in the partly dried swamp mud, the siren's gills were stumpy and rough looking. The siren kept coming to the water surface in the aquarium, to take in a mouthful of air. Then it would sink again to the bottom, soon to emit a string of bubbles from the gill slits. In a day or so the gills had spread out to a fernlike structure, and from then on it rarely came to the surface, seeming to gather all necessary oxygen from the water.

Never was there the slightest attempt to bite, or anything but a strong flounce if lifted from the water by hand. The body was well muscled, as it needs to be to swim through the muck of the woodsy ponds. The small legs were used a lot, and probably help in its natural habitat. The dried swamp bottom showed tunnels, somewhat like those of a ground mole. Very likely this creature spends much of its time searching in the muck for earthworms, much as ground moles do in a different habitat, although one authority says it is a vegetable feeder, and another work tells of one specimen being kept alive in London for a year or more on a diet of earthworms.

This salamander has been known for a long time, although it is doubtful that anyone knows very much about it. Early in colonial times it was found by Dr. Garden of South Carolina. His description finally reached Linnaeus, who included it in his work on natural history.

Once, during my absence, the aquarium was outside during a cold snap, and the surface of the water froze completely over. The siren lay quiescent at the bottom, and as the temperature gradually rose, and the ice melted, it resumed its normal activity of moving around the glass cage. It always seemed to be trying to dig into a soft bottom that could not be found. As it had already lived through as severe cold in the niche in the swamp mud, and without either water or food, I did not worry about the cold or that earthworms were not available at the time.

The eyes—scarcely worthy of the name—were very

A rain water pond, back in the woods, among trees hung with Spanish moss, was the place in which this interesting salamander lived and where it was found in the moist muck of a dry pond during an exceptionally dry winter.

small and a dull whitish color. Apparently the skin covered them over, and they were without eyelids that moved. Anything held in front of them just did not register, yet the creature ceaselessly moved away from the brightest light. Probably this was the only use it could make of the eyes.

The proverbial black cat in a coal cellar at midnight would be not much harder to photograph than this specimen. It not only was black and would need a lot of exposure, but it also was shiny. Since it disliked a bright light, it was always moving when photography was tried.

A picture in the aquarium was quite out of the question, so it was finally put in a white enamelled tray, covered with water enough to reduce some of the shine, and carried out into the diffused light of a clouded sun. Fast film and the Graflex completed the job, but even then it required very careful printing, and was partly out of focus.

When spring came, with its rains, I visited the pond again, and dug out from the muck some partly-grown sirens, much lighter in color, and with some fine spots on them, and a lighter line along the jaw, along with various frogs and other amphibia.

The knowledge of local outdoor men, however unlearned, is always useful when it concerns the wild things of their community. Theirs is earthy knowledge, gained from close acquaintance, and when the chaff of local legend and tall tales is winnowed out, there remains much solid grain of truth for the interpretation of the more interested student.

Many passers-by heard of the strange creature in my aquarium, and came in to see it, or to repeat some local bit of lore. The common name seemed to be "lampus-eel" or "lamper-eel," which would equally fit this species or *Amphiuma*. The lamprey-eel is, of course, a much different creature, but that the name had been appropriated, in a slightly different form, is not strange.

One told me that they sometimes crawl out on the ditch-banks, which would be a hard task for *Amphiuma*, and which had been recorded many years ago as a habit of *Siren*. Considering their aversion to bright light, probably they would prefer to come out at night. Is it possible that they deposit the eggs at such a time? If so, in what sort of a location, and why have they not been found more often? Indeed, there is much to be learned of this strange salamander.

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Some Grow Littler

By W. L. McATEE

My title is approved by the dictionary as to the first two-thirds but certainly not as a whole. "To grow" does not always signify getting larger; no, one meaning is "to become" and that meets my need. As to the last third, anyone who has ever been little knows what littler means. "Some grow littler" has the advantage of calling attention to the infrequency and to the unusual character of a happening among birds that is not generally recognized. Certain young birds, either in the nest or out, are larger than their parents and undergo a shrinking process as they mature.

Among the gulls and hawks, the greater size of the fledged young appears to result from their having a heavier coat of longer feathers. The difference between immature and adult herring and ringbilled gulls is very evident when the two age classes are observed together, especially as they sometimes are seen stalking over expanses of lawn in waterside parks. The brown young appear bulky and clumsy in contrast to the trim white and pearl-gray adults.

How many kinds of hawks have the long-feathered young is uncertain, but two of them do to such a degree that early ornithologists were led to regard them as distinct species. Alexander Wilson's white-breasted hawk, described as new mainly because of its larger size, is the redtail in immature plumage. And Audubon's Bird of Washington, long carried in the manuals because of uncertainty as to its status, is the young bald eagle. Its greater size, thought to be proof that it was a different bird, was but the transient bigness of youth. That bulk is noticeable when the dusky young are seen in company with their white-headed and white-tailed parents.

Where the "growing littler" involves meat rather than feathers, it takes place before the birds leave the nest. In various small birds there appears to be a consolidating process just before fledging time. It has been measured in at least one species—the violet-green swallow—in which it involves a reduction in average weight from 20 or 21 to 15 or 16 grams, or about one-fourth.

Remarkable examples are furnished by certain birds of the shearwater and albatross alliance. Lockley observed on the British Island of Skokholm that when fully feathered the young Manx shearwater "is suddenly, completely, and forever deserted by the parents, after which it remains for a time in its burrow, fasting and drawing upon its own reserve of fat." This period lasts from 11 to 15 days and is terminated by the fledgling's finding its way to the ocean side, where it either plunges into the water or takes to flight. The quoted language is from Robert Cushman Murphy, expert upon this group of birds, who suggests that the trait described is probably characteristic of many related species as it fits in with various disconnected observations on their life histories. According to the same author, leaving the young to experience a period of fasting has its most extreme manifestation in the wandering albatross. The young are carefully (Continued on page 164)

This splendid picture of a cougar was taken by Leo Jobin in British Columbia. The photographer had built a blind beneath a tree toward which his dogs had driven the "lion." His only weapon when the cougar arrived was his camera, and with it he shot this picture just before the animal took to the tree before the arrival of the pursuing dogs.

The American Cougar

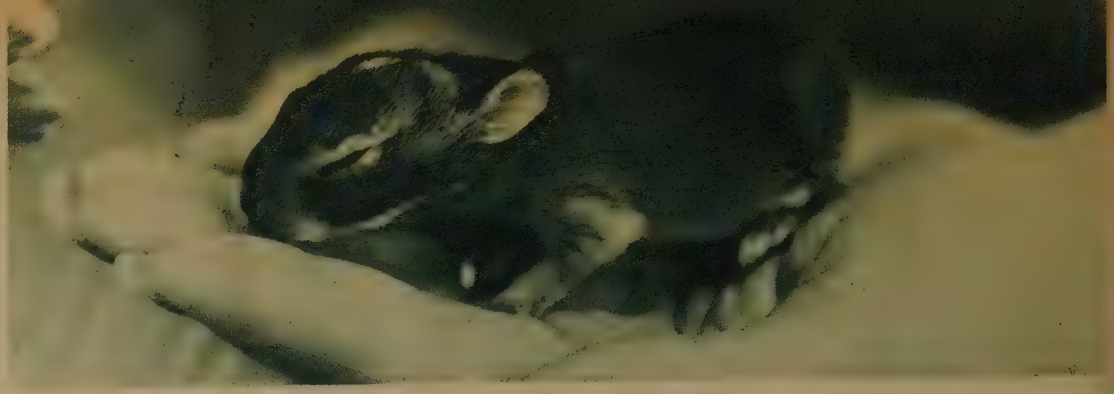
By EDWARD A. PREBLE

It would be difficult to state whether more words have been written on the ferocity of the cougar, or on its gentleness. It is a powerful animal, for it is a cat. Still, unprovoked attacks on human beings are almost unknown, and deaths from cougars since America was discovered could probably be counted on one's fingers. While some of the recorded instances of friendliness toward unarmed persons, related by certain early authors, are difficult to credit, certainly the wild cougar seldom exhibits any desire to harm the woods walker or camper. Hundreds of wilderness campers can tell of personal experiences where full-grown cougars have come into camps at night, and after walking quietly about among the slumbering campers, have gone back to the forest without their presence being suspected. Surely such a visitor cannot be charged with savage intentions.

Originally the cougar had the greatest range of any American mammal. From Patagonia to southern Canada, except in the most forbidding desert areas, some form of this highly variable animal was found. Wherever the cougar lived some form of deer found its home, for these were the cougar's principal prey.

But with the coming of the white settler the cougar was bound to decrease. Naturally it caused some destruction of game and domestic animals, and it did not long survive settlement, excepting in large forested areas. Thus it persisted in the Adirondacks until about 1890. It had been extirpated in New England earlier; in some of our eastern states in colonial days. In the extensive swamps of Florida a few have survived until recent years.

In the West, with rougher and wilder conditions, the cougar has held on better, but it now seems likely that, unless given some protection, it will be extirpated in the United States within a few years. In some of the instances of deer increasing to such an extent that they must be reduced, as in Arizona, Utah and California, one factor has been the over-destruction of predators, including the cougar, or mountain lion, which in a state of Nature kept the deer populations from increasing beyond their food supply. In the earlier settled parts of the country the time when excessive numbers of predators could be supported was passed years ago, but in the wilder parts of the West, a few more cougars could well be retained, in National Parks and Monuments at least, if not in special sanctuaries to preserve this great American cat.



Winter mornings reveal the paths of the rabbits through the soft snow as they seek food. During the day bunny may be discovered hunched in a form, where it is quite inconspicuous. Once disturbed from a bed they seek another one. Above is a young rabbit about one week old. It has taken on its first coat of soft, fine and silky hair, but its eyes are not yet opened.

In Re Rabbits

By W. BRYANT TYRRELL

Gardeners and orchardists are, to say the least, restrained in their enthusiasm for rabbits. When one sees a newly-sprouted garden nibbled by some hungry cottontails, or fruit trees de-barked near the ground by rabbits seeking winter foods, this attitude is understandable. Yet there is something so appealing about the bright-eyed little animals that one is inclined to forgive much. Also, their life close to civilization, with cats and dogs added to natural enemies,

Found in a nest that had been uncovered by a mowing machine, this baby was one of a litter apparently abandoned by the mother, or orphaned. It was fed, at the tender age of about three weeks, from a doll's nursing bottle. At this age the baby is a small replica of its parents

is not an easy one.

In winter rabbit tracks in the snow testify to searches for food, and the alert tramper may find the beds, or forms, in which the bunny has spent the day. Rabbit nests, with young, are harder to find, being usually built in an oven-shaped hole in a tuft or bunch of thick, tall grass. This nest is lined with fur pulled from the belly of the mother, and is used for only one brood of young, although one female may have as many as eight broods a year. The average is about four. Each litter numbers from four to seven members, sometimes more.

Like the young of most mammals, baby rabbits are born naked and with eyes closed. Within a week they take on a coat of fine, soft, silky hair and their eyes begin to open. At three weeks they are miniatures of the parents. During the first few weeks of their lives they are closely watched by the mother rabbit. The male seems to have no concern about his offspring. Feeding the babies seems to take place at night.

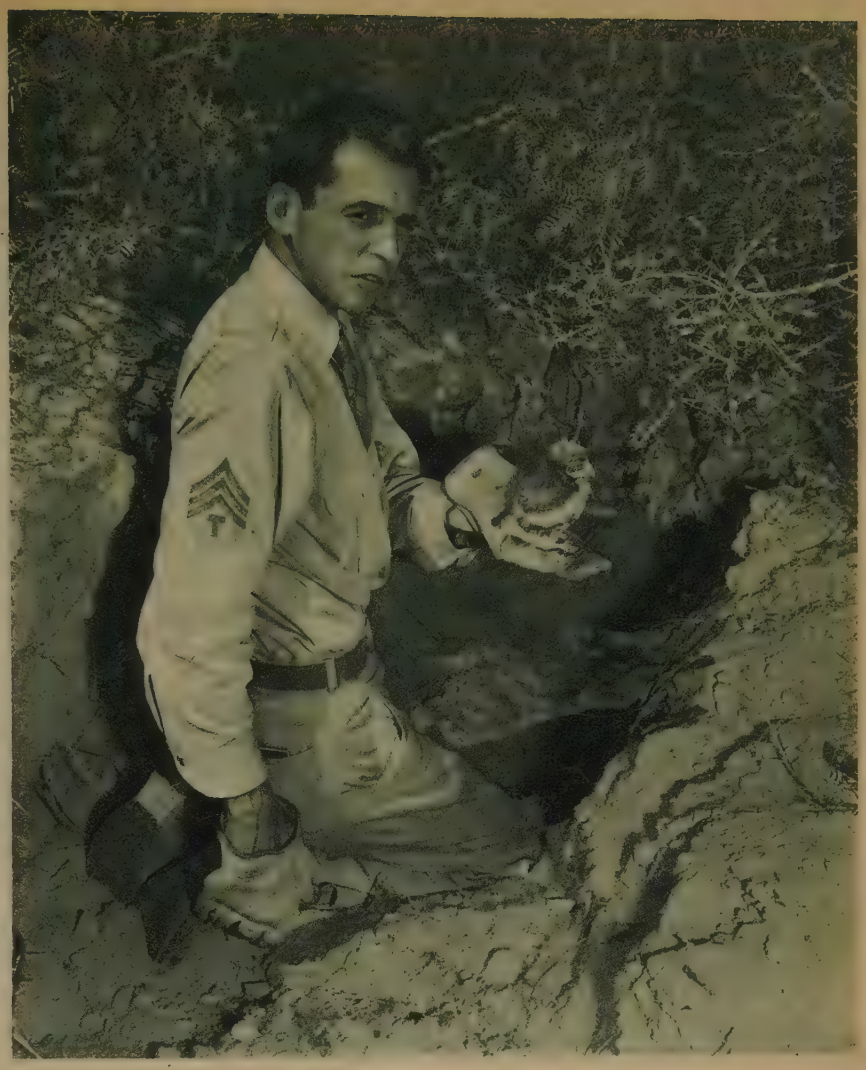
There are more than sixty species and sub-species of rabbits and hares in North America, and they are found from the Arctic to the tropics. Of these, twenty-four are varieties of the common cottontail, which lives in most parts of North America below the Canadian border; rarely above it.

By the time the little rabbits are five or six weeks old they forage for themselves, but are wise enough to seek the shelter of clumps of grass or large garden plants. "Pete", the rabbit below, was cared for by the author until it was about two months old. When he was liberated he seemed reluctant to leave and spent the rest of the day making up his mind. The next morning he was gone.

Two parent burrowing owls watched the intruders from their favorite perch in a nearby mesquite tree. From the same perch they watched for rodents to catch as food for their young. Opposite, the author and photographer returns one of the baby owls, which had scurried from the burrow, to the companionship of its brothers and sisters. They are shown beyond when blind.

Burrowing Owls

GEORGE McCLELLAN BRADT



Of all the fascinating furred and feathered inhabitants of the dry and lonely deserts of our great Southwest none are more worthy of a naturalist's attention than *Speotyto cunicularia hypugaea*—the western burrowing owl.

Late one night last spring my wife and I surprised a pair of these strange elfish birds in a low mesquite a few miles east of El Paso. A week later, on May 20, we returned to the vicinity of the thorny, green-leafed tree to look for the owls' subterranean nest. A short search among the yucca, cactus and mesquite-covered sand hills was sufficient to locate the mouth of a narrow tunnel conspicuously littered with the telltale manure chips and old pellets characteristic of an occupied burrow. After an hour and a half of steady digging I reached the end of the twelve-foot passage. In the process we not only removed innumerable shovelfuls of heavy sand, but, in addition, the following testimony to the amazing variety of a burrow-

The last view of the rapidly maturing owls. Not many days later they left their home underground to hunt and fly on their own in their desert habitat.

ing owl's diet—twenty-one whole or partial kangaroo rats, two pocket mice, two young pack rats, one white-footed mouse, one scorpion, the remains of two large lizards, and portions of six small snakes.

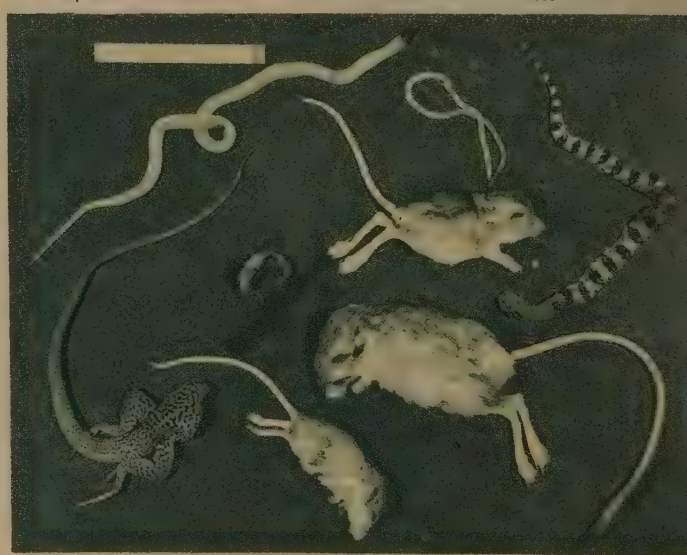
The nest itself was little more than a shallow depression on a level slightly higher than the floor of the tunnel. It was lined with manure chips, scraps of newspaper, and shreds of rotten cloth. In it huddled nine baby owls. They were covered with a gray-white fuzz, were blind and completely helpless. They moved about very little but did greet us with a faint buzzing sound startlingly similar, except in volume, to that made by an angry rattlesnake.

After photographing the nest's ghostly occupants we carefully rebuilt the burrow with the aid of two long cardboard boxes opened at the ends and covered with sand and brush. During our entire visit the two adult owls had remained close by to watch our every move, screaming and snapping their hard beaks all the while.

Ten days later we scraped the sand from the box-burrow to find that the tunnel had been dug back another two feet, and that the owlets, now only seven in number, had acquired a respectable amount of soft, short, brown and buffy feathers. As soon as they heard us at work on their home they commenced the usual rattler-like buzzing.

In the nest with the remaining owls were two freshly-killed kangaroo rats and one tiny owl skull. At the first sight of us all but one little bird turned their backs upon us and began burrowing into the well-packed sand. They used their little beaks for picks and kept their eyes tightly shut against the flying sand. The single nonconformist chose to dash past us out into the desert sunshine where he turned about to face us, stretched upon his tiptoes, and honored us with a profound, albeit drunken, bow. I then gently returned him to his brothers and photographed them all.

Testimony to the value of the burrowing owl in maintaining the balance of Nature in the desert is found in this display of the partial contents of the owl's subterranean larder.



The white mother robin appears to be talking over the domestic situation with her normally-colored mate. In fact, she seems to be giving him a lecture, with her head cocked to one side, while one may imagine a slightly brow-beaten attitude on his part.

Toronto's White Robin

By HUGH M. HALLIDAY

For three successive years a white robin successfully reared her young on the same city lot in Toronto, Canada. Never previously have we heard of an albino bird achieving such success. Indeed, an albino is usually considered weak and unlikely to survive. The eyes, sensitive to light, are thought to be defective, seriously handicapping the bird in gaining a livelihood and in avoiding enemies. Albinos are usually hampered by brittle feathers that break easily.

The first season, after the white robin had chosen her red-breasted consort, she built her nest on a support against the side of the house. The next year she selected a robin shelf in the garden. When she returned the third time she built under the eaves overlooking the street. But, unlike most robins, they rear only one brood annually. The first and second seasons there were three young, all of normal color. The family numbered four the third season.

Observers claim that the white bird chose a different mate each year, and when she arrived back in the spring from the South, she became the center of attraction for numerous suitors. Although she chose to nest near one particular house, she became a familiar figure for several blocks around and during a single week-end, hundreds of persons came to watch her at her domestic duties. She had little privacy.

The color of the mother robin makes not a bit of difference with the insatiable appetites of the offspring in the nest. Although albinism causes a brittleness in the feathers, and some were broken, the mother sloughed these when the time came to go foraging for food.

Father lends a hand with a juicy worm for the young. These baby robins, according to the geneticists, possess a gene for white, but they are not likely to pass it on and produce any white young unless they should happen to mate with another robin also having a white gene.

While she was incubating some of her feathers became broken. When the young hatched, however, and she was forced to hustle for food, she quickly sloughed off the disfigurements. Then it was that the accompanying photographs were made.

Since the site of the nest was heavily shaded we were forced to use flashlight equipment. Measuring the distance from the nest to the ground, we obtained a long pole and planted it in front of the nest. With the aid of a ladder we clamped the camera and synchro-flash in proper relationship to the nest and made the exposures by pressing a button at the end of fifty feet of electric wire.

When the young have commenced to take care of themselves the white mother always disappeared for the balance of the summer, yet no reports have been received of her being seen elsewhere. In the fall, however, before leaving for the South, she always returned to spend a week or ten days in the garden where she had nested and raised her families of young.

The progeny of this white robin and her normally-colored mate have been normal in color. But they doubtless carry a gene for white in the chromosomes of the millions of cells composing their bodies. And genes, the geneticists tell us, are the conveyors of all the faculties, traits and tendencies that parents hand down to their children. If one of the offspring were to mate with another bird, also carrying a gene for white, one out of four of their young, according to experiments with mice and other animals, ought to be white.

On the other hand, if the young mate only with normal robins, each successive generation would cut in half the chances of an albino being produced until the possibility would become extremely remote. Eventually, however, once in from ten to twenty thousand cases, two robins, each carrying a gene for white, mate and a single albino nesting may result.

The mother robin on the nest, the youngsters by now quite filling the home. The fame of this robin spread all over Toronto and weekends brought hundreds of people to watch the domestic activities of the family. Each year the bird selected the same house near which to build her nest.

As We See It

★

A World "Free of Insects"

We commend for serious and mature consideration the leading article in this issue of the magazine. It is, we believe, significant in thought and implication, even beyond the subject it discusses—the new insecticide, DDT.

This insect-killer has accomplished remarkable things in connection with the war. It has, on substantial evidence, prevented or checked epidemics; saved lives of soldier and civilian; made life more endurable for our fighting men. Therefore it has been spectacular, newsworthy, "front page stuff." Its story has been told, frequently and variously, and too often with all our American talent for hyperbole—even overstatement.

Similar treatment has, in the past, been found in premature announcements of remedies and cures for some of the elusive ills of man, including cancer, tuberculosis, arthritis and even the common cold. Such stories, blown up in the newspapers, or by overdramatic writers on medical subjects, have left a wake of disappointed and disillusioned sufferers. This the true scientist and physician deplores, but scientific integrity cannot always control excesses of human enthusiasm.

In his article Mr. Teale seeks in no way to detract from the great proved accomplishments of DDT, or to belittle its potentialities. Rather does he urge a sound and objective view of the insecticide, and an appreciation of its proper place. The chemical company responsible for its introduction into this country has ever been conservative in its claims for DDT; all competent economic and medical entomologists have haltered their enthusiasm, awaiting all the facts. Many writers and editors, unhampered by such professional restraint, have let the adjectives flow in all their glory.

We would not, perhaps, have been too seriously disturbed by this congenitally American practice were it not for ample evidence of public misconception and dangerous conclusions. When, however, muddy thinking gets to the point where a professor of biological science, addressing a meeting of science teachers, hails DDT as promising a fine new world "free of insects," surely something needs to be said, and in no uncertain terms. Such a viewpoint, infinitely multiplied in the public mind—as it inevitably must be by superficial publicity—is dangerous beyond the realization of the layman.

The American Society of Economic Entomologists, at its annual meeting last December, adopted a resolution declaring that "never in the history of entomology has a chemical been discovered that offers such promise to mankind for relief from his insect problems as DDT." But, the statement added, "there are limitations and qualifications." These last include an as yet inadequate knowledge of the toxic effect of the substance on man and other animals; the long-term effect on soils; data on mixtures and dosages for various insects; the effect on plants and on those eating them.

"DDT will not kill all important insect pests," say the economic entomologists. "It will kill many beneficial insects which are allies of mankind against the destructive species. Because of its toxicity to a wide variety of insects, its large-scale use might create problems which do not now exist. To illustrate, it is a superior insecticide for control of codling moth on apples, but in some sections at least will kill certain natural enemies and thus release other insects which may then become major problems."

Thus we have in this insecticide a potential agent of great probable importance to public health, household comfort and agriculture. But we also have something so powerful that its use must be strictly controlled and restricted, even, probably, when its full potentialities are known.

Mr. Teale has effectively pointed to tragic examples of man's thoughtless tampering with Nature's scheme and balance. He has cited some of the many functions of insects that are vital to our very human existence. There are many other valuable species that cannot be discussed in a brief article; many delicate adjustments in the insect world that man cannot afford to upset.

Let us, then, look objectively and scientifically at this new insect-killer. Let us await the results of careful experiment and research, leaving DDT in the hands of those who know the danger of such poisons until such time as it may be released on a sound and safe basis. And, above all, let us get out of our minds the idea that man wants to—or can—survive in a world "free of insects."

You may be sure of no dull moments with—

A Cougar in the House

By HAZEL E. NELSON

★

When we were getting this article ready for the printer we wrote to the author to learn how the heroine was progressing. We received the sad news that "Cookie" had passed away at the age of four and one-half months. Indeed, she had not originally been expected to live but a few days, but the care given her by her foster human parents overcame a latent internal trouble for many happy weeks. Since the article was written in the present tense, and since "Cookie" is, of course, a living memory to her guardians, we have not changed the tense, although the question asked in the closing sentence of the story must, unfortunately, remain unanswered.

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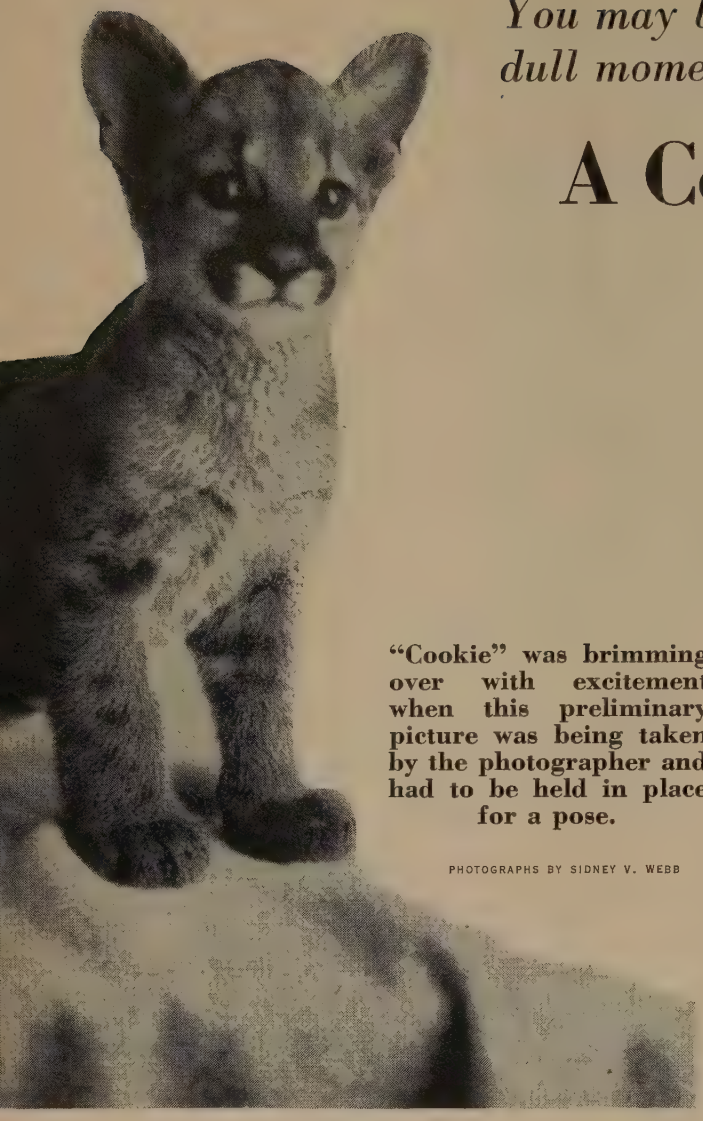


"Cookie" was brimming over with excitement when this preliminary picture was being taken by the photographer and had to be held in place for a pose.

PHOTOGRAPHS BY SIDNEY V. WEBB

IF YOU are equally fond of both puppies and kittens you would enjoy raising a cougar cub. Our cub is an interesting and entertaining combination of both. The cougar has always been our favorite member of the feline family, perhaps because it is so persecuted by man. So we were particularly delighted when offered a brand new cougar baby to raise.

Cookie, as we christened our tiny addition to the family, was born in the Zoological Gardens, Durant Park, in Oakland, California, on the eleventh of June, 1944. She came to us the following day. The first week was a trial for her as well as ourselves, due to feeding difficulties, added to which colic was ever present. In due time a satisfying formula was found, consisting of slightly diluted cow's milk to which was added lime water, cod liver oil, and a dextrose syrup.

At the age of one month beaten raw egg and blood extracted from raw liver were added alternately to each formula. By six weeks scraped raw meat was introduced twice daily. The bottle was discontinued at three months, and a variety of raw meat and fowl became the final, permanent diet. Fish and raw eggs are disdainfully refused by Cookie, although both are excellent "cat" foods. In true cat fashion she tries to "bury" any food not to her liking. With such generous-sized paws this is an amusing sight.

An amazing amount of water is consumed each day, in fact far more than a grown dog might drink. Two ritualistic habits accompany meals. Cookie always lies down to eat, as though she were resting over a strenuous "kill." Immediately after eating she hops into her bed for at least an hour's nap.

At birth Cookie had a soft-as-silk coat of grayish-white fur. (We were told she was a bit off-color.) Soon, week by week, the fine fur became coarse and slightly rough to the touch. At three months her body spots began to fade, being replaced by a reddish-tinged top coat. At that time there was a suggestion of a tuft at the end of her tail, and what a long tail, too! When walking, the black tip of her tail is carried upwards in a curve. To us there is nothing more attractive than the snow-white cougar mouth, with its "butterfly" pattern.

How unusual it seems for a cat to have warm brown eyes! Cookie's eyes turned from a misty blue to brown during her fourth month. One thinks only of our canine friends having brown eyes, with golden eyes for the cat family.

Cougar cubs are round balls of fluff for about the first six weeks. From then on they gradually become long, lean cats. This is due, perhaps, to the cougar being an agile tree climber, making a slim body a necessary characteristic.

Like most cats, wild or domestic, Cookie proved to be very clean in habits. Beginning at five weeks of

Attempts to photograph the cougar at home all failed because she would not remain still long enough. The studio lights, however, resulted in a drowsy baby.

age, she was trained to utilize cartons padded with newspapers, a habit she never forgot.

We believe Cookie has as versatile a voice range as any pet we have owned. She can "out-purr" any house cat, for her loud rattle is heard constantly. She has an "I mean business" growl when annoyed, and a clever little grunting noise is made when she greets the family cats. Best of all, however, is the fascinating, inimitable cougar whistle. Actually, it sounds far more like a bird call; hardly what one would expect from a cat. This whistle is especially used when her meals are being prepared, and when she accidentally becomes lost.

There is no nocturnal prowling in Cookie's young life. Except for the first week, when we sleepily crawled out of bed several times each night to administer a demanded bottle, Cookie sleeps on a schedule she herself adopted. She retires to her own bed the moment we retire, and remains there quietly until morning. This is a better record than that held by our own youngsters when infants. Each morning we call to Cookie before getting out of bed, and her return greeting is an anxious whistle.

Young cougars are good-natured pets if raised quietly, and without too much chaos around the house. They can become quite rough at play, but seldom, if ever, vicious. This is assuming, of course, that the cub was raised from an early age. We do not display our pet to the general public, for she is not a curiosity. The few who have enjoyed "meeting" her are all animal lovers. Cookie resents aggressive, excitable persons, so, directly before showing her to a newcomer, we simply ask the person to remain quiet and unconcerned, allowing Cookie to do her own introducing. As yet Cookie has made no enemies.

Cougar cubs are about as playful as any pet could be, wild or domestic. There is never a dull moment in the daily routine of our Cookie. She can thump noisily, or slink about the house on silent feet. Her favorite sport is creeping up on us, finally jumping out with her front paws up in the air "ghost" style. "Shaking to death" the hems of drapes and bedspreads gives her splendid neck exercise, and much pleasure. Incidentally, if you think more of your home furnishings than the fun derived from such a pet, do not try raising one! Ankle grabbing was another pastime, although much to our relief she lost interest in it—after about three weeks of our having to travel from room to room with a husky cougar cub securely wrapped around an ankle. There has been little or no damage from her claws, due to our keeping them trimmed quite short. However, there is nothing we can do about her teeth, for she uses them to advantage on anything chewable. In this respect young cougars are much like puppies. A braided leather toy, plus a rolling rattle, purchased

(Continued on page 164)

In this pose "Cookie" watches the rattle held up to attract attention, a mischievous paw ready to strike at it.

PHOTOGRAPH FROM U. S. DEPARTMENT OF AGRICULTURE

A scene that has become familiar during war years and one that must be reenacted in 1945 if we are to perform our full task of winning the war and providing added food supply.

Although victory is almost in sight, the demands of war make increased efforts necessary in—

Your 1945 Victory Garden

By ANDREW S. WING

Secretary-Manager, National Victory Garden Institute.

"THE man or woman who grows a Victory Garden not only serves his country but himself." This was the assertion of the War Food Administrator at the garden conference in Washington in late November. Since then the war situation in Europe has certainly not improved. Points have been raised or restored on a number of food items, including canned vegetables.

There is no need for any panicky feeling. Nobody will starve, for sensible people are well aware of the many advantages of supplementing reduced wartime diets with fresh foods from their own home gardens. But it is much to the point to summarize some of the reasons why Victory Gardens are going to be even more important in this year that should bring V-E Day.

First of all, the Army needs food, and is asking for it. "The surplus food bogey," as one high Army official put it, has been laid to rest. We cannot risk the danger of having too little food any more than we can risk having too little ammunition.

Second, the War Food Administration has overcome its fear of overproduction, and is now leaning the other way. It has definitely asked every family in the United States that had a garden in 1944 to grow one in 1945. That means more than 20,000,000 gardens, using the Gallup poll figure. This includes you, and me, and everyone else who has the time, energy and a suitable piece of land. And there are not many people, except in the heart of big cities, who cannot find a bit of ground if they look hard enough—or the time, either.

Third, the sense of security that comes from having a good supply of fresh vegetables and fruits in the garden, and shelves laden with canned or stored produce, is worth a great deal these days of tightened ration regulations and scanty market supplies.

Fourth, millions of families have learned, for the first time, how much better the vegetables and fruits from their own gardens taste. This discovery being made, a home garden now has a permanent place in the lives of many who never gardened before.

Last, but not least, millions of men, women and children have come to know the joy and satisfaction of working in the earth. They have found what Prof. Hugh Findlay of Columbia University calls "the strength that comes from the soil."

Summing it all up, it would seem that to have a Victory Garden in 1945 would be about one-tenth patriotism and nine-tenths enlightened self-interest.

What to grow, and how to proceed to make one's garden effort most effective, are the first practical questions. As usual, the good gardener will have his plans laid out on paper before he touches a spading fork. Having helped in the judging of several hundred gardens last summer, and in the selection of the national champions in the Green Thumb Contest staged by the National Victory Garden Insti-

tute, I have observed certain characteristics that most of the successful gardeners seem to possess in common.

Orderliness is perhaps the most outstanding virtue of the good gardener. To be orderly means having a plan and following it. And planning is based on past experience in the garden. What were the best crops you grew last season? Which were enjoyed most by the family? Which saved the most money, or points? What vegetables should be eliminated in favor of others that are more productive, disease resistant, or of better quality? Which vegetables were a total loss because the family would not eat them?

If you have a record of your 1944 garden, that will be a big help. If not, take a seed catalog and run through the pages from asparagus to tomatoes and mark the varieties that you know from experience or reading are good. No good garden is static, and all good gardeners make changes every year.

For instance, in my own garden, which was a community plot of one-tenth of an acre, I shall make the following changes:

1. Make earlier and later plantings of such things as lettuce, corn, carrots and snap beans.

2. Plant fewer tomatoes and broccoli (we love both but had too many), and lengthen the bean season by adding limas and pole snap beans.

3. Change the varieties of a number of vegetables. For instance, plant all standard size sweet corn—no more midget varieties which do not yield enough for the space occupied. Add a yellow variety of tomato in place of a mid-season red variety, the main crop to be Rutgers. Replace Bibb and Mignonette lettuce in favor of Oak Leaf, Simpson, Cos and Great Lakes. Plant three instead of four varieties of squashes, the main summer crop to be Zuccini, the fall crop, Acorn. One variety of cucumber and watermelon to be enough. Mind, this is a *big* garden, 60 by 70 feet, so there is room for specialties as well as experimentation.

4. Add a number of things omitted last season, including: Brussels sprouts, okra, and celeriac (knob celery).

5. Omit peas and spinach, which are pretty much a waste of time and space in our region. Swiss chard, Tampala and New Zealand spinach, supplemented by beet tops, mustard and turnip tops, will give us all the greens we can eat. The peas we will have to buy, fresh or frozen.

6. The ground will be ready earlier, I hope, and it will be in better shape because of having been worked two years. More lime will be added and several good applications of commercial fertilizer will be made throughout the season.

7. This year I will be ready for the cut worms, which made an early blitz attack on young tomato, cabbage and other plants. Poisoned bait, as well as collars around the young plants, will be used. Likewise, I shall be ready with rotenone dust and other insecticides and fungicides for the very first signs of bugs or blights.

8. Having tried both staking and "flopping" with tomatoes, I shall tie up all plants next season, regardless of number. If possible, I shall mulch tomatoes and certain other vegetables to insure against drought, and to save labor in weeding.

I am writing of what I believe is the *best* garden I have ever had, and which some of my friends generously said was one of the best in town. However, being closer to it than anyone else, I can see how it can be made at least fifty percent better this season, if I am fortunate enough to be allotted the same piece of ground again. It takes at least a year to learn how to handle any new garden.

U. S. D. A. PHOTO BY W. J. MEAD

Tomatoes are one of the most satisfactory of Victory Garden crops. (Editor's note: Last year we raised a lot of tomatoes but we were not as photogenic as this young lady, by a long shot, when we were harvesting.)

The Green Thumb winners nearly all had large gardens, and therefore were able to plant a wide variety of vegetables. Constant care and vigilance seemed to be the watchword. In some cases yields were materially boosted by water being available. All the leaders made a special point of liberal plant feeding and the prompt use of insecticides. Mrs. Catherine Benzo of Norway, Michigan, uses barnyard manure, compost and special feedings of chemical fertilizer. At 69 she has been gardening for some forty years, has been winning prizes on her tomatoes for twenty-five years. The able youngsters, all 4H club members, who carried off the junior honors in the Green Thumb Contest, had large gardens beautifully cared for, thanks to plenty of elbow grease and some expert supervision from trained leaders. One could not avoid notic-

U. S. D. A. PHOTO BY W. J. MEAD

Worm's-eye view of Swiss chard properly spaced and with the outer leaves ready for harvest. These average about a foot high and should not be left to grow too coarse and overgrown.

ing, however, in the reports on these large gardens, that not so much attention was paid to succession cropping and intercropping as was true in the smaller, more compact city and suburban gardens. That brings up, again, an important point:

Plan your garden to suit your site and your family. If yours is only a 20- by 25-foot plot, you will need to plan more carefully and work it more skillfully to get the same proportionate results obtainable from a generous 50- by 100-foot farm garden where you have room for long rows, and where a wheel hoe or horse cultivator may be used to advantage. On the whole I would say that the small-to-medium-size garden requires more skill, and is therefore more fun. But it *is* a pleasure, after being confined to cramped quarters and not quite enough sunshine, to be able to turn around in a large, sunny plot.

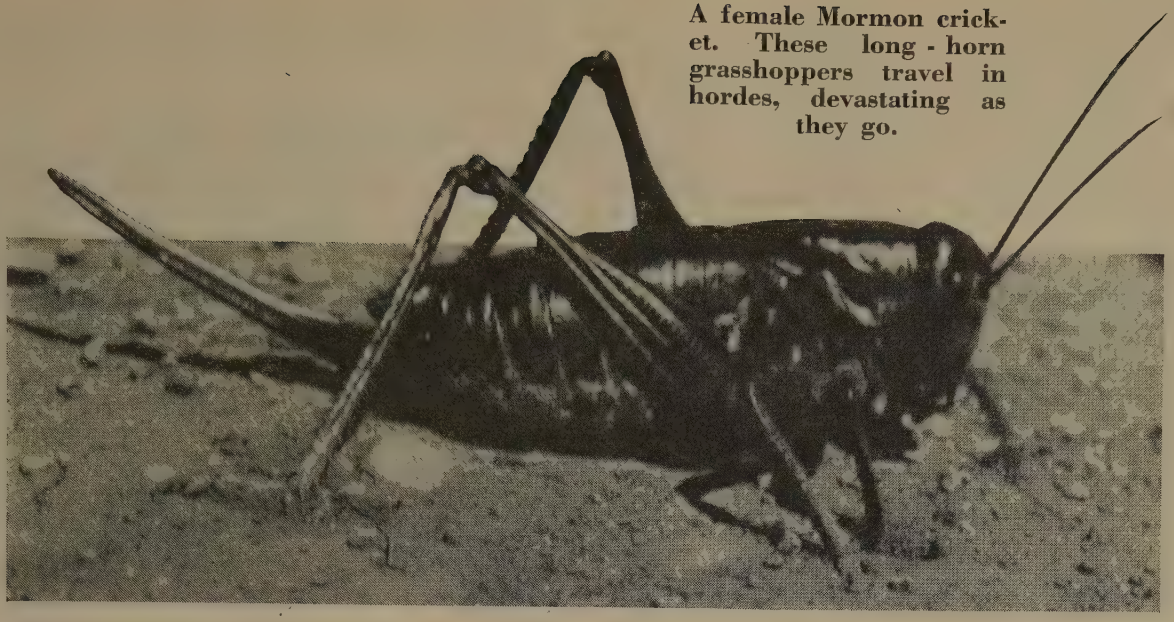
Another serious drought is not likely, but one can never be sure of weather, so it is just as well to be prepared. If a hose connection is impractical, the next best thing is a mulch of grass clippings, straw or other organic matter. However, many gardeners got through last season's dry spell better than their neighbors by careful cultivation and by keeping a shallow dust mulch between the rows.

To offer specific advice as to varieties and cultural practices to a national audience is always a dangerous practice. It is much better to conform to local practice, so consult your local garden leaders, or your expert neighbor, when in doubt about when to plant, what to plant and the handling of difficult soil and cultural problems.

Generally, there will be plenty of seeds, fertilizers, insecticides. Garden tools are supposed to be in rather more plentiful supply. However, as usual, it is the early gardener that gets the hoe, and prompt ordering is advised by those in the know. You have to buy your seeds and other supplies eventually, so why not *now*. It will be a favor to your seedsman, as well as insurance for yourself. That holds true for flower seeds, bulbs, plants and nursery stock, as well as for vegetable seeds and supplies.

And while on the subject, there is no reason for not having a few more flowers in your garden than you had last year. In fact, it is looked on with favor so long as it does not cut down the total production of food. Most of the prize-winning (Continued on page 162)

Displaying the fruits of their Victory Garden labors, Mrs. Ann Hite of the Graflex Victory Garden Club, and her husband, say that they will be on the job in their plot in 1945.



A female Mormon cricket. These long-horn grasshoppers travel in hordes, devastating as they go.

Forecasting Grasshoppers

By T. SWANN HARDING

Photographs from U. S. Bureau of Entomology and Plant Quarantine

GRASSHOPPERS are sadly misnamed. If they merely hopped the grass, as their name implies, they would not be a great deal of bother. But they are not content with mere hopping and "spitting tobacco juice." They can mow down wheat and corn like a devastating plague. They can entirely devour cotton, alfalfa, and small-grain crops in general. After disposing of crops and grasses they will eat the leaves and bark of deciduous trees, or, in extremity, even tackle pines, firs, and spruces.

As early as 1797 grasshoppers were injuring New England crops; by 1818 they were appearing in vast hordes. In 1877 they accomplished crop damage to the value of $200,000,000. Congress took action, and the United States Entomological Commission was authorized to investigate and propose control measures. Today the Bureau of Entomology and Plant Quarantine copes with the hoppers, and Dr. Claude Wakeland has his headquarters at Denver as chief of the Bureau's Division of Grasshopper Control.

While some states have in them as many as a hundred species of grasshoppers, we may thank Providence that a mere five species cause ninety percent of all the grass and crop damage. Then there is the "Mormon Cricket," a species of long-horned grasshopper who does mighty well for himself, too. He came into the picture about 1848, and was once so numerous in early Utah days that the Mormons resorted to prayer. Gulls are said to have appeared in response and to have destroyed the scourge. From this episode came the popular name.

The five species that vie with the Mormon cricket in damaging crops are the migratory, the differential, the two-striped, the red-legged, and the clear-winged grasshoppers. All of them have a lot of natural enemies, and the weather is also unkind to them occasionally, but every so often a variety of factors favors their reproduction. Then one can literally shovel them up on the roadways, and they cover the earth like a mantle.

The Mormon crickets are also highly migratory, and difficult to catch in one place very long. Bands of them perform as units. All crickets within the band move in the same direction at the same time, and continue to do so unless disturbed or split by some insurmountable object. The principal weapon we have against all the grasshoppers is poisoned bait.

In 1938 Federal funds were appropriated to aid the twenty-four states most afflicted by the grasshoppers to cope with the menace. This involves efforts to predict the probable prevalence of the grasshoppers in various areas in coming seasons. But, just because it is so mobile, the Mormon cricket partially eludes efforts to forecast its prevalence a year later. This is normally done by estimating numbers found in specified localities the previous fall.

In general, spot counts are made of egg-laying adult grasshoppers. This assists the entomologists to predict the probable damage the insects will inflict next season. Then re-surveys are made for the actual prevalence of eggs. These are checked against the earlier estimates and spot maps are made. Thereafter final maps are drawn in which areas of greater or lesser anticipated grasshopper prevalence are dis-

Mormon crickets, known to science as *Anabrus simplex*, crossing the road on the Fort Hall Indian Reservation. Towns people often turn out to try to halt the insects in their march.

tinguished by the use of various colors.

The quantity of bait to be purchased and used is planned on a basis of these surveys and predictions. The control measures are less successful than the entomologists wish, but they do pay big dividends in crops saved from destruction, in whole or in part, much above their cost. If concerted action is taken early enough on the basis of predictions, city and town people participating, as they often do, serious crop losses are prevented. But delay, to see what will happen, or until grasshoppers begin flying from field to field, is fatal to successful eradication, and very costly to the farmers' crops.

★

Feathered Watch-Dog

All about a swoose

By MARI FRADE

SEVEN years ago, when a friend of the family brought home five swoose eggs, we were thrilled, for we could watch them hatch. At that time we had a large buff Orpington hen that wanted to set. Instead of giving her chicken eggs, we gave her the swoose eggs. Swooses—perhaps we should say sweese—are part swan and part goose, and are beautiful and intelligent.

"WEEPY"

We could hardly wait the thirty days it took to hatch the eggs; however, when the right time arrived only one swoose hatched. The hen refused to take care of him, and threw him out of the nest. Meantime we had purchased some baby chicks, which we gave her to care far, and we took care of the swoosling.

The first sound the swoose uttered was "weep" so we named him "Weepy," and to this day he is still "Weepy." At first he lived with the baby chicks, but he grew so much faster, on his bread and milk diet, that we had to put him in a separate place away from the chicks. We carried him outdoors for his daily romp in the sun, until he learned to follow us around.

He has the run of the backyard all winter, but in spring we have to pen him up in a spot near the water, into which he seldom goes, except to take a drink. He can have a good time taking a bath in a large pan of water, however. During the winter when he gets too cold, he taps on the back door; then I have to spread newspapers on the floor in the utility room and he sleeps there all night.

He makes a much better "watch-dog" than some dogs. No stranger gets near the house without his making a loud racket. He does not quack; his call is that of a swan, almost like a dog's soft bark. The electric meter reader and the oil man are afraid of him.

Weepy is a beautiful shade of creamy tan with dark brown back and wings; a dark stripe up his long neck ends in a large dark knob on his forehead. His eyes are orange and brown.

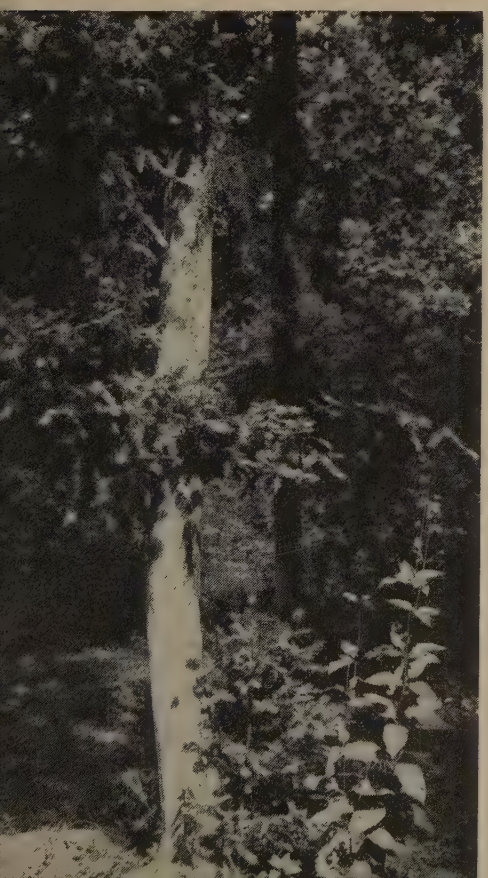
When he sleeps he bends his long neck around and slips his head under a wing, as many birds do. When it is cold and snowing he picks up his feet, first one, then the other, shakes them off, and slips them into pocket-like places under his wings. He always sleeps facing the wind, thus shedding wind, rain or snow.

Torreya, A Tree with Possibilities

By WINTON H. REINSMITH

Torreya tree reportedly planted on the grounds of the Florida State Capitol at Tallahassee by its discoverer, the botanist Hardy B. Croom. The top of the tree has been taken out because it was shading some of the windows. Thus it appears rather shrubby.

MOST unusual, and probably the most underdeveloped, of Georgia's native trees is the torreya, otherwise known as the "stinking cedar." Far from being an ugly duckling in its symmetrical appearance, this sharp-needled conifer really does merit its odious moniker when one crushes the foliage, which promptly reeks to high heaven with a rank pungence not unlike that of coarse weeds such as poke or wild carrot, with a dash of the resinous thrown in. The scientific name is *Torreya taxifolia*, which gives an inkling that it belongs to the Taxaceae, or Yew Family. The general appearance of the tree bears out this botanical fact and relationship.



A torreya tree showing its coarse, bristly foliage and the light brown bark. Sucker growth, characteristic of this tree, is seen at the base.

Some enthusiasts in the past have dubbed this oddity variously, "Gopher Wood," "Cedar of Lebanon," "Noah's Ark Tree," "The Wood Eternal," and other higher sounding titles, but all such are belied by science, as well as by history. Neither this species, nor any of the other three torreyas of the world, ever inhabited the Biblical locale, or anywhere else in the near East. So we will have to abide by this odorous nickname, "Stinking Cedar," and try to forget it by calling it torreya.

In Georgia *Torreya* occurs only on the east bank of the Flint River in Decatur County, a few miles northward from the extreme southwestern corner of the state, petering out toward Bainbridge. From River Junction, confluence of the Flint and the Chattahoochee, its range extends fifteen miles southward into Florida, hugging the high east bank of the muddy Apalachicola, to Alum Bluff, high spot of Florida's bluff country. No occurrence has been reported on the west banks, which are low, heavily-forested flood plains. This 18-mile belt, averaging a few hundred yards in width, is the total range, the only place where this species occurs in the world. Thus it is almost as scarce in Georgia as the renowned *Franklinia* or Bartram Tree, discovered and collected by the King's Botanist, John Bartram, in 1765, on the Altamaha River, seen once more there in 1790, and never again found native there, or anywhere! Fortunately *Torreya* has not disappeared.

Yet *Torreya* is a fugitive species, following its slow retreat from northern climes during the Ice Age. There seems little danger of its extinction, since it reproduces profusely enough, although ultra-locally, from seed and by means of sucker-sprouts, but so far it has failed to retrace its steps

northward, except possibly for its slow creep into Georgia toward Bainbridge.

Perhaps the same is true of the other three species, which likewise appear to be derelicts from an original sub-arctic base. *Torreya californica*, the "California Nutmeg," seventy to one hundred feet tall, inhabits streambanks on the western slopes of the Sierra, ranging in places up to elevations 3000 to 5000. *Torreya nucifera* lives in Japan, where it attains a height of seventy feet and has found wide usefulness as furniture and builder's wood. *Torreya grandis* inhabits a limited area in China. Judging from botanical descriptions—and the several authorities substantially agree — all four are much alike. It intrigues the imagination to contemplate these four floral "cousins," so widely separated.

A sprig of the foliage of *Torreya taxifolia*. The needles resemble those of the yew.

Generations ago, during the heyday of river-boat economy, the farmers of Liberty and Gadsden Counties, Florida, discovered that this bright yellow wood is "very durable in the ground," hence it became popular for fenceposts, which were "better than red cedar." Craftsmen of that era in Apalachicola and other Gulf ports found its soft, dense, straight-grained, clear-yellow heart wood valuable for making furniture and wooden novelties. Probably those pioneers made serious inroads into the torreya stands of that day. But to preserve for posterity the best remaining stands, near Rock Bluff Landing, the State of Florida established and developed Torreya State Park. For ornamental planting the tree is a "dud," since, away from its precipitous river bluff habitat, it loses its erect, symmetrical, sweeping grace and grows into a lumpy, nondescript "bush."

The species was first discovered on the Apalachicola Bluffs by the botanist H. B. Croom. It was later named in honor of Dr. John Torrey, one of the most distinguished of earlier American botanists. Typically, the tree grows to a height of forty-five feet, has an erect, symmetrical shape, horizontal to drooping branches of two-ranked, yew-like lustrous, dark-green needles about one and one-fourth inches long, sharp-spined at the tips like those of Cunningham Pine. The pulpy, plum-shaped fruit ripens to a purplish hue, then bursts and drops its heavy seeds to the ground. These, and the suckers and stump-sprouts grow into a veritable porcupiny thicket about the bases of the oldsters. Near Rock Bluff Landing, the tree exhibits probably its maximum development of modern times, attaining 60 feet in height and up to 18 inches diameter. And this is on a 60-degree steep river bluff and crowded between huge overshading oaks and beeches. Here it seems as tolerant of shade and as indifferent to competition as are the Appalachian mountain spruces. North of River Junction, *Torreya* mixes with the hardwoods.

The botanists who explored the Apalachicola Bluffs in 1934 found *Torreya* a well-established part of the climax and sub-climax forest types found there. It has been suggested that it be planted on steep stream banks in the Georgia mountains, in a habitat similar to that apparently preferred by its cousin in the Sierra, the California Nutmeg. The fact that torreya's present site is largely underlain with the Tampa limestone does not mean necessarily that it demands an alkaline or neutral soil, but does suggest that the tree also should be tested in the limestone coves and valleys of the eastern Tennessee mountains. A specimen is reported as hardy in Rochester, N. Y.

I recall the story of some ancient black-bearded mariners, probably those earlier Siberians, who in the beginning of the 18th century landed on our Pacific Coast below the mouth of the Columbia. After capturing or chasing away the Indians there, they proceeded to ransack the immediate vicinity for a yellow and bad-smelling wood that made a beautiful yellow dye. The Indians had observed that the bearded men came to carry off this wood each year when the cold weather had ceased. Following the advice of an old man, these Indians had destroyed all of these trees so that the bearded men came no more to the mouth of the river. In truth these banks, which were formerly covered, were then naked and there remained only a small quantity of this wood in this country, only sufficient for the dyeing of the people themselves. This was, possibly, the California Nutmeg.

Farmers might well experiment with a few dozen *Torreya* seedlings in farm gullies or wooded ravines. There is a postwar job for some Florida nursery to make them available in quantity. Meanwhile, information as to their present limited availability can be ascertained from the Florida Forest & Park Service, Tallahassee, Florida. One way or another, it would be well to get a copse or two of them to grow, then, in a few years, begin to use the home-grown "fenceposts everlasting." Torreya suckers freely from a cut stump. Later, it would be possible to go into furniture and gewgaws of torreya wood, using seasoned fenceposts, and replacing the old ones with fresh green ones.

Remora, the Shark Rider

By G. C. CARPENTER

★

Three remoras or sucking fish attached to a shark. All the thrashing of the big fish in the course of his capture failed to dislodge the piscatorial hitch-hikers from the body of their host.

★

THE barnacle-covered old piling shook when a rope about it slackened, then grew taut. A shark had gulped the Sailors' Choice bait, had been caught by a hook of no mean proportions, and then, furiously taking a dart for freedom, had been brought up short. That spot in Florida's Indian River instantly became turbulent from the writhing maneuvers of the fish. But it was fast. The post, the rope, the sash-weight sinker, the cow chain, and the hook—well through the under lip of chinless piscis—all conspired to give the stalwart fisherman a bit of fun. Hand over hand he snubbed the rope against a piling. Lost feet of line were regained, smarting palms and rope-burned fingers were unheeded in the excitement of the capture. The shark was too heavy to lift straight upward; it had to be guided along the dock, and dragged through the shallow water to the shore.

But just a moment—was the catch more than just a shark? All the sideways jerks of that thick-skinned head, and all the lashing of a tricky tail had not dislodged three blue-black oceanic hitch-hikers.

These shark-suckers, or remoras, comprise a family that includes several genera and many species inhabiting all warm seas. On the head of each fish is a suction disc. It is with this ridged, corrugated-looking apparatus that the remora attaches itself to the belly of a large fish or sea-turtle for free transportation. However, as in this case of the shark riders, they often fix themselves to the back of the host, which necessitates their riding upside-down. Yet they seem to travel thus with apparent ease, evidently caring little how they get where they are going, or where they go, so long as they have a free ride. And they are less conspicuous to possible enemies from being similar in color above and below.

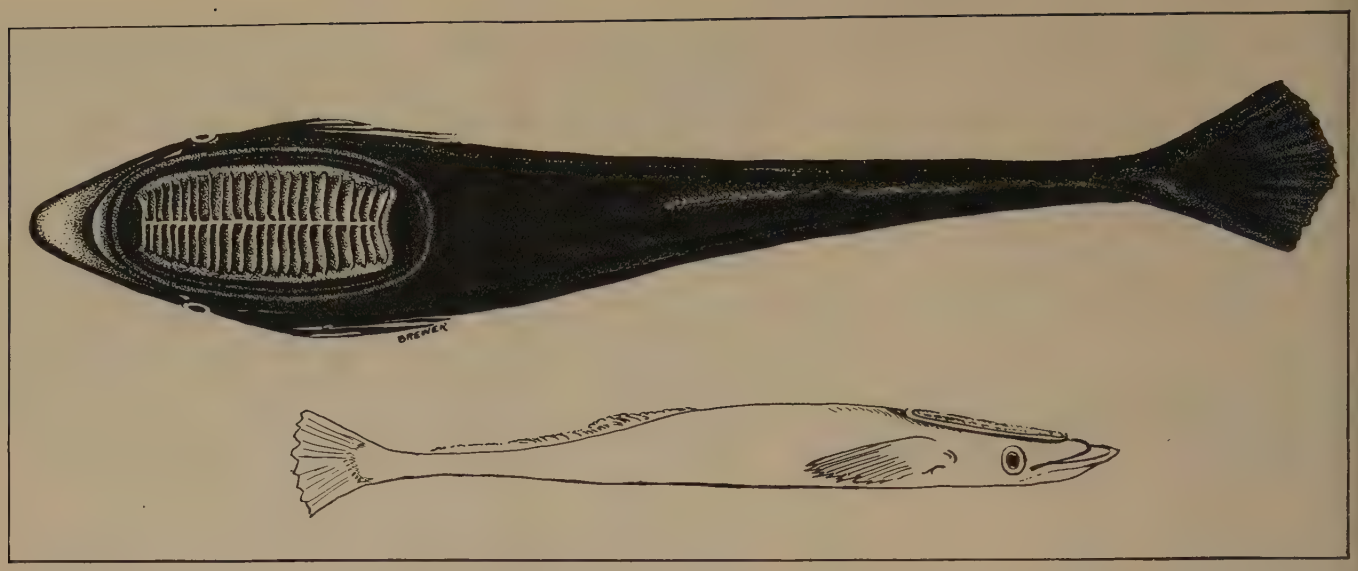
It is a fact to be weighed in wonderment that the adhesive head disc, which had been evolved from the spinous part of the dorsal fin, has the power to permit the lifting of objects many times the weight of the remora. If the sucker clamps itself to a much heavier organism, both may be lifted by simply pulling on a cord tied to the remora. The speculations of trained zoologists as to how such a device could have evolved would be interesting.

These tenacious creatures, which range in length from only about eight inches to perhaps two feet, are different in many respects from their relations. In place of the usual sail-like dorsal fin is this unique organ that seemingly has no relation to a fin's normal function. The remoras can detach themselves to feed on small fish, then pick up another ride.

The suction disc retains its novel power even after the remora is dead. If the fisherman who hauled in the shark, with its free riders, pulls off these remoras and lays them on the dock, he will have trouble later, when they are dead, to dislodge them. But perhaps he knows the trick used by native fishermen of pinching the discs. If this is done they readily loosen.

Fishermen in tropical waters use these remoras to aid in the catching of large fish. They make "suckers" of the sucking fish by tying lines to them and sending them after larger fish. They may then attach themselves to sharks, huge turtles, or other big aquatic creatures. And, since they have such strong suctorial powers, the larger game is dragged to its doom.

It was believed in ancient times that the remora could arrest ships in full sail when attached, and in earnest. We read of a happening in 31 B.C., when Octavianus was warring with Antony and Cleopatra



The equipment of the remora. The upper drawing shows the corrugated sucking disk of this flat-headed fish. The lower drawing is a side view of the animal.

at the battle of Actium. It was supposed that Antony's galley was held by a remora that defied the efforts of hundreds of Antony's men. Although this sounds like a tale partially to excuse Antony's defeat, doubtless this vacuum-headed hitch-hiker has caused plenty of trouble in the waterways, and led many a gullible fish benefactor to an untimely death. There are many of his kind today, finless but with lungs, who stand on dry ground and thumb their rides.

But back to the fisherman with his shark and remoras. By this time he has killed the shark and cut out its backbone to use in the fashioning of novelties. And as for the sucking fish—they are not considered edible in this country, so, are back in the river.

★

Question and Answer

By PAUL H. OEHSER

What does it take
To make the heart leap . . .?

Once at Niagara Falls,
Far over the dizzy walls,
I saw a little brown bird
Perched on a tiny branch
Singing unheard
Against the avalanche—
As if every note
Would burst its trembling throat;
As if there were no noise
To drown such perfect joys—
A valiant rhapsodist
Lost in the wind-blown mist.

What does it take
To set the heart aflame . . . ?

Once nearby
Where George and Martha lie,
I saw a small young turtle
In a bed of myrtle
Strutting along the fence
In awkward confidence—
Until an attendant fool
Making a wry grimace
Crushed with a steel tool
The diamond carapace,
And with a sickly sound
Ground it into the ground.

To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south. Time given is Standard Time; add one hour for War Time.

The Zodiacal Light

By ISABEL M. LEWIS

It is in late February and March—when twilight is disappearing in the west—that the zodiacal light is seen to the best advantage in the evening sky in the northern hemisphere. Far away from the glare of city lights, on a clear, dark, moonless night, one should then be able to trace a wedge-shaped beam of light, reaching from its broad base on the western horizon in the constellation of Pisces upward toward the constellations of Taurus and Gemini. The distance to which it may be traced along the ecliptic to its apex in one of the zodiacal constellations will depend upon the clearness of the air and the latitude of the place. At this season of the year, in this hemisphere, the ecliptic rises most sharply from the horizon, so that the effect of haze near the horizon obscures its light less than at other seasons, when the ecliptic rises at a smaller angle from the horizon. For the same reason the zodiacal light is best seen in the *morning* sky before sunrise in early fall, when the ecliptic then rises most sharply from the eastern horizon.

Within the tropics the zodiacal light is always seen at its best, for there the ecliptic always rises nearly perpendicularly from the horizon, and twilight is so short that the stars seem to rush forth with the setting of the sun. It is within the tropics that the zodiacal band may be seen under favorable circumstances extending completely across the heavens, from west to east, along the ecliptic.

Even more difficult to observe is the gegenschein, or counter-glow, a small oval patch of light fainter than the zodiacal light and to be found directly opposite to the sun.

There are two distinct theories as to the cause of the zodiacal light and the counter-glow. According to the one most generally accepted, the zodiacal light

consists of sunlight reflected from cosmic dust particles that lie in, or close to, the plane of the ecliptic, and extend even beyond the orbit of the earth. Some believe that there are two such rings of meteoric particles surrounding the sun, one within and one beyond the orbit of the earth. Each tiny particle shines by reflected light, and moves in its own orbit around the sun. The gegenschein, or counter-glow, has been explained as reflected light from particles that have been drawn into a dynamical whirlpool, or vortex, at a distance of about a million miles beyond the earth's orbit and opposite to the sun, where the rival attractions of earth and sun tend to pull the particle in different directions. A second theory explains the zodiacal light as a reflection of sunlight from particles that are swarming around the earth in the form of a ring similar to the rings of Saturn, and at a distance of thousands of miles from the earth's surface.

It is a peculiarity of the zodiacal light that when the observer is north of the ecliptic the main part of the zodiacal light lies north of it, and when the observer is south of the ecliptic the main part of the zodiacal light lies south of the ecliptic. For an observer on or near the ecliptic, it is equally divided by it. When the observer is carried by the earth's rotation toward or away from the ecliptic there takes place a corresponding change in the position of the boundaries and apex of the zodiacal light with respect to the constellations against which it is seen. Unlike the Milky Way, which has a cold blue light, the zodiacal light is slightly yellowish in color—as might be expected—since it consists chiefly of reflected sunlight. Very noticeable changes in the intensity of the zodiacal light are observed at times and there is also a decided division of its light into a Diffuse Light, which comes from the outer part, and a Stronger Light, which lies along the base of the wedge near the horizon, and along the central axis to a less distance from the horizon than the paler Diffuse Light. The part of the light that lies very close to the horizon and, like the Stronger Light and Diffuse Light, is wedge-shaped, is called the Effulgent Light. The three lights of different intensity, constituting the zodiacal light, are easily distinguished in the tropics but are much less clearly defined in the temperate zones.

The nature of the zodiacal light is such that it is not well adapted to telescopic or photographic study at astronomical observatories. It is an ideal object of study for the amateur astronomer who is located within the tropics. The most complete observations of the zodiacal light that have been made up to the present time, and the most valuable, were made by a Navy Chaplain, Rev. George Jones, who had no previous experience in making astronomical observations but who undertook, at the suggestion of a friend, Professor Dana of Yale, to make continuous observations of the Zodiacal Light. He was acting as Chaplain on the U. S. Steam-frigate *Mississippi* during her cruise in the years 1853-55 in the Far East with the United States Japan Expedition under Commodore Perry. These observations were made, mostly at sea within the tropics, under ideal conditions for observing this phenomenon, of which so much is still unknown. They were published in a large volume shortly after the return of the expedition, and few copies now exist. One of these is in the library of the Naval Observatory in Washington. There were, in all, 328 recorded observations made in a period of 750 days, from April 2, 1853 to April 22, 1855. Although most of them were made within the tropics, others were made in latitudes ranging from 41° N to 53° S. To quote the words of Chaplain Jones: "My own observations, I believe, are the first of any detailed character ever carried into latitudes south of the equator or even into regions about the equator line." After about March 1, 1853 he never failed for one evening or morning (Sundays excepted), until reaching home on April 22, 1855, to see and make record of the zodiacal light when moon and clouds did not interfere. On several occasions he also made the surprising observation that there exists a moon zodiacal light. This disappears, in every case, soon after the moon rises.

To illustrate how brilliantly the zodiacal light shines at times within the tropics, Chaplain Jones tells the following story: "I remember on one occasion, when on the *Mississippi* during her late cruise, we had sighted the lighthouse of Point Du Galle in Ceylon in the evening, and the ship was ordered to be kept lying off till the morning would permit us to enter the harbor, word was passed for the officer of the deck to send for the captain and first lieutenant at early dawn. I was on deck in the morning at my observations a few minutes after four o'clock when the lieutenant on duty came to me and said, 'Don't you call this early daylight?' I answered, 'No. It is not daylight yet.' 'Why,' he said, 'what do you call this over here,' pointing to the zodiacal light, which was showing with an effulgence that might easily have led to such a mistake, though it wanted more than half an hour to the earliest dawn." Although many men at sea must have seen the zodiacal light in all its splendor in the tropics, it seems that most of them are unaware that (Continued on page 164)

Orion in Spring

By HARRY ELMORE HURD

Westward, strong Orion stood,
Breast-deep within a shadowed wood.
One shoulder, starred with ruby light,
Thrust against the cobalt night
As though he willed to stem the tide
Which surged above the countryside.
He strove, and striving sank from sight,
Engulfed by phosphorescent night,
And where he was—but was no more—
Was awesome, like a bolted door.

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George H. Newton—Manager

The Dark Continents of Your Mind

DO YOU struggle for balance? Are you forever trying to maintain *energy, enthusiasm,* and the *will to do?* Do your personality and power of accomplishment ebb and flow—like a stream controlled by some unseen valve? Deep within you are minute organisms. From their function spring your emotions. They govern your *creative ideas* and *moods*—yes, even your enjoyment of life. Once they were thought to be the mysterious seat of the soul—and to be left unexplored. Now cast aside superstition and learn to direct intelligently these *powers of self.*

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The ROSICRUCIANS

San Jose (AMORC) California

Animal Friendships

J. Frank Dobie's article, "Strange Animal Friendships," has turned up additional evidence of such relationships, and, apparently, aroused considerable interest among our readers. From Decatur, Michigan, a reader sends a page of the *Decatur Republican* containing a story of a dog that raised two pigs on the farm of George Osborn of nearby Celery Center. Sally, the sow, had no sooner been moved to an indoor pen than she gave birth to twelve healthy pigs. In three days, however, all but two were dead. Something was wrong with Sally, since she lay on or stepped on her offspring, so the two remaining ones were taken into the house to be bottle-fed. Tootie, the dog, had just had pups, so the pigs were added to her brood. They never needed the bottle again, and romped and slept with the pups. When the pigs were old enough to feed from a basin they were put in a pen, but afterward, whenever the pigs got out of their pen, Tootie, who was a fine stock dog, would round up and drive back all save the two she had suckled. She seemed to know them up to the time they became hams.

Ernest E. Rich reports from West Palm Beach, Florida, another friendship incident seen last summer at Plainfield, N. J. Bess and Bob were, respectively, kitten and puppy and close friends, becoming more and more attached to each other as they grew up. When Bess became the mother of a litter of kittens, Bob would sniff and fondle them proudly. Bess never resented these familiarities. Then one evening, after a heavy downpour, Bess brought in in her mouth, one by one, several newly-born rabbits. She placed them among her kittens. Immediately her attitude toward Bob changed. She would spit at him, even when he looked at her brood from a distance. He acted hurt, but she would no longer trust him. The kittens were older and more aggressive than the bunnies, and the latter failed to survive, much to the disappointment of human observers who wondered at the outcome of such a mixed family arrangement. However, Mr. Rich observes philosophically, "some fine things don't need the climax we sometimes think they do. They are fine without it."

Forest Values

Charles E. Randall and Marie Foote Heisley of the Division of Information and Education of the U. S. Forest Service have collaborated in the revision and rewriting of the bulletin *Our Forests: What They Are and What They Mean to Us.* It is published as Miscellaneous Publication No. 162 of the U. S. Department of Agriculture. In thirty-eight pages the authors have presented for a general audience the story of our forests, their distribution, service, enemies, administration and national resource value.

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LOOK FOR THE LEAF ON THE PACKAGE

The School Page

Edited by E. LAURENCE PALMER

Professor of Rural Education, Cornell University and Director of Nature Education, The American Nature Association

AXES AND TAXES

My colleague Professor Joshua Cope tells me that in a park in Bristol, England, there is a sign that reads as follows:

"Let no one say, and say unto your shame
That all was beauty here, until you came."

This is the basic sentiment that determines what I do in the management of a small eight-acre woodland across the street from my home. For years, I have kept hunters out, with the result that you now can find more tracks of red squirrels, gray squirrels, flying squirrels, red foxes, gray foxes, rabbits, weasels, pheasants and grouse there than in any similar area I know of within miles of my home.

I have kept wood cutters with their axes, and campers with their matches, away from the place, with the result that today I know of no place within a mile of our university library tower where one can find a greater variety of wild flowers and more interesting underbrush. Incidentally, I have also kept out botanists with their vascula.

One should not gather from the above remarks that I have kept all people out. On the contrary, I have invited anyone in who can respect the sentiment of the Bristol, England, sign. A few youngsters whom I have trusted have slept there overnight on the understanding that they must have kept their camp site so clean and unmolested that I am unable to find it. One of the better of these youngsters is a fine boy, a promising naturalist, and he probably knows the area as well as I do, considering our relative backgrounds of experience.

On the day before Christmas, in preparation for writing an article for a Sunday newspaper, I took a swing through my woodlot in search of ideas. As I came to the entrance, where there is a huge red oak with a trunk more than two feet through, I stopped in my tracks. The beautiful, uniformly gray trunk bore a "blaze" two feet long and nearly a foot wide. A glance up the hill disclosed other blazes on the highway side of the more perfect trees. An even dozen of the bigger and better trees had been badly defaced. Naturally, I set out to find out who was responsible. I even posted a reward.

Just a New Axe

Among the first of whom I made inquiry was the above mentioned Boy Scout who lived in the neighborhood. Imagine my surprise when he confessed immediately, saying that he had been given a new axe for Christmas and just went over "to try it out." He said that it "worked beautifully." That neighbor boy would no more hurt a wild bird or mammal than he would me, and the last thing he would have done to me was to cause me any trouble. He did not try to laugh off the depredation, seek an excuse for his acts, or try to whitewash himself in any way. That was to his credit. Yet for years his thoughtlessness will have ruined for me a place that meant much to me.

I cite this here not in criticism of the youngster, since he is almost as disturbed over it as am I, but to discuss what one should, under such circumstances, do about it. Should I lend him some extra axes; try to buy another woodlot; lend him a gun, or tell him that there is a lot of dead wood in the tract that would make a swell campfire next summer when the woods are dry? Possibly, I should visit his home and have a fireside chat with him on some other subject, since we do not seem to have done so well with axes. Whatever the solution, I, at least, have learned one lesson and that is the danger of putting powerfully destructive tools into the hands of inexperienced, uninstructed, irresponsible hands. In this case, I feel partly responsible. Although I never suspected such a thing would happen, I confess that in my walks in the woods with this youngster I had never taken the time to show him how a tree lives and grows. I am paying the price for my neglect.

Other problems, basically similar to this one, are all about us and need our attention. As for destructive weapons, we have pointed out the potential dangers of wholesale use of DDT. We know that many will die after the war because they played with war souvenirs. Only today, I read of a soldier—returned from two years in the South Pacific—accidentally killed fooling with a Jap rifle he had brought back. We all recognize the dangers that accompany high-powered machines of all kinds, whether they do mechanical work, take us from place to place by air, water or over ground, or help us otherwise. These machines can make life easy for us, but in the hands of amateurs they are more dangerous than was the axe in the hands of the boy.

Pen and Press

The pen may be more powerful than the sword and the printing press than the axe, but they may be destructive, too. Most of us older naturalists "ate up" the earlier Nature books. I read *Bird Neighbors* again and again before I was out of the grades. Later, I learned of fishes from Jordan and Evermann, of mammals through Stone and Cram, of spiders through Comstock, of shells through Rogers. I believe that the first book I bought with money I earned was Stone and Cram's *American Animals.*

The press can do much for a youngster one way or another. Because of this, I am disturbed over a new book I have just bought from the firm that sold me my first Nature book. On the jacket, and in the introduction, of *A Picture Book of Nature,* I find that, "on its merits," the book "deserves a place on the bookshelf of the most advanced of Nature students"; that the authors "have verified every fact"; that "the information given can be regarded as absolutely authentic." I have tried to learn, from the publishers, the background of the authors but have received no reply. I can say that as a "comedy of errors" it outrivals the worst of the more recent elementary science series, and that is a distinction I for one did not expect to see attained.

Good Printing Anyway

The book is a masterpiece of printing and a disgrace to Nature literature. Among the "absolutely authentic" items we find are that the anther is a part of the pistil, that most eight-inch trout weigh little more than a pound, that a moth's wings when at rest are horizontal, while those of a butterfly are at an angle with its body. Incidentally, the moth used to illustrate this position holds its wings when at rest in the allegedly typical butterfly fashion. The book would be a splendid one to have in a science library if it were used to develop the ability of embryo students to read critically. For my own part, I was almost as disturbed to get this atrocious Nature book from my favorite Nature publisher as I was to find that one of my best-loved boy neighbors had not shown good judgment in the use of a valuable tool that had been entrusted to his care. I only hope that *A Picture Book of Nature* does not ruin the confidence of too many budding naturalists in the value of really good Nature literature. Loss of faith in an individual or in an institution is always tragic.

On a tombstone near my boyhood home there is the following epitaph:

"Mary . . . . . is her name. America was her nation.
Cincinnatus was her dwelling place and Christ was her salvation.
The rose is red; the violet, blue. The days are gone
Which once she knew
But those who knew her now remember
That J.C. was her Great Redeemer."

It is possible that the initials of the Great Redeemer were used to save space and money. But with such abbreviations rampant in our modern way of living we are losing some of the old-fashioned virtues. We feel we must call everyone by his given name and pat him on the back. Three or four men have to get together and call each other by their first names to settle the great problems of the greatest nations of the world. We should let our children "find their way" without direction, and certainly without discipline, according to some modern philosophies. When we fought the Civil War, we did not have to think of our president as AL, nor was the directing genius of our Revolutionary War, GW. And yet no one doubts the close sympathy these men had for the common man.

Whether George Washington ever used a hatchet on a cherry tree or not I do not care. But if he did, he obviously was, like my neighbor boy, willing to admit his mistake and take the consequences. I do not pretend to be any seer, but I do not understand why, if I have the money, I can go into almost any restaurant and fill myself up on meat courses without surrendering a ration point, and yet cannot get those same meats to use more economically in my own home. I can not understand why, when I get my A gasoline rations, I should not, at the same time, buy my five-dollar automobile use stamp. Then, I would know that everyone else was buying his, and that I was not being a conscientious sucker by buying my stamp at the post office, while others never bother. I can not understand why, if everything is so perfect, my share of the national debt should be $1962. At the end of the Revolutionary War, GW left us with a per capita debt of $20.95. At the end of the Civil War, AL left us with a per capita debt of $85.01. TR brought it down to $15.11. WW was elected to keep us out of World War I, and left us with a per capita debt of $225.89, which was "terrible!" CC and HH reduced it to $183.24. There are a lot of things I do not understand, and yet I think the teaching profession is partly responsible for the situation in which we find ourselves.

Flippancy can never be a satisfactory substitute for statesmanship. Opportunism can not take the place of integrity. Vacillation can not supplant decision. Vaudevillism and dignity are not of equal importance. Blatancy and scholarship are not synonymous. Bankruptcy and solvency do not lead to equal happiness. Footwork wins fewer battles than headwork. License can never be so constructive as can discipline. Strikes and patriotic sacrifice are not worthy of equal credit.

As teachers, we have a real responsibility in developing integrity in the youngsters who in years to come will visit "the parks" we are now establishing. We can not let things "just grow." We can not wait until young folks or young nations or groups of nations have become full grown before we show them the value of disciplining themselves and insist that they begin doing it while we have some authority over them. We should show them how to use axes, taxes, pens, voices, treaties and their influence NOW. We will have to drive our lessons home again and again and again, and hope that when the coming generations take over our responsibilities we will have done our part.

"Let no one say, and say unto your shame
That all was beauty here, until you came."

Audubon Teachers' Guide

Through the formation of Audubon Junior Clubs the message of conservation was carried to some 276,000 school children last year. These clubs are sponsored by the National Audubon Society, and are for children in elementary and secondary schools all over North America. Dues are small, since an endowment covers more than half of the expenses of this work, and the dues take care of certain materials for the members. To give added point to this work and make the constructive educational value of the clubs more resultful, the *Audubon Teacher's Guide*, prepared by Dorothy A. Treat of the Audubon Society staff, has been issued. This splendid 92-page booklet is available free to any teacher organizing a club, and can not but be of outstanding value to the teacher in planning club activities. The brochure is sub-titled: "A Source Book for Advisors of Audubon Junior Clubs," and it is certainly that. In addition to many practical suggestions for activities, there is a fine bibliography of helpful material. In the interests of conservation education we hope that the club enrollment will far exceed the 300,000 anticipated for 1945.

Young Naturalists

Now in its sixth year, Young Herpetologists and Naturalists of America is reported by its founder, Miss Allyn Wood, to be bowling along nicely, but eager to welcome more members. This organization is a correspondence club of those interested in Nature. Miss Wood, whose address is 2502 North Alabama Street, Indianapolis 5, Indiana, acts as a sort of hub around which revolves this exchange of natural history information. She writes that the members wish to round out the group with boys and girls with other than herpetological interests, adding to the number of ornithologists and specialists already members. The only membership rules are that fourteen is the minimum age, and the member must be truly interested in Nature. There are no dues. A new crop of young naturalists has grown up since the Y.H.N.A. was organized five years ago last October.

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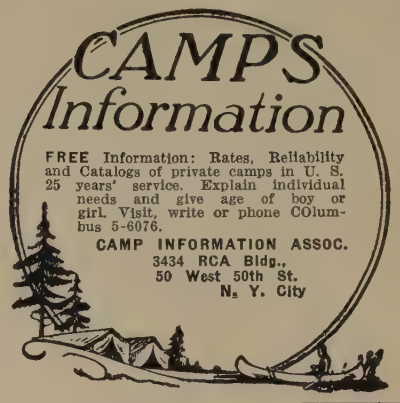
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DDT

(Continued from Page 124)

to get rid of squirrels, which were injuring young trees. They formed shooting clubs and wiped out most of the animals. Then wood-pigeons, usually kept reduced by the squirrels, increased until the Scotch farmers wished the squirrels were back. In Jamaica, when rats became a burden, the mongoose was introduced to clean out the rats. It did. But then it developed such an insatiable appetite for poultry that it became a far greater pest than the rats had ever been. On the Murray River, in Australia, fishermen slaughtered cormorants, which appeared to be feeding on the fish they were after. But when the birds were gone, the fishing became worse instead of better. Then it was discovered that the main food of the cormorants had been crabs and eels, the very creatures that devoured the spawn and fry and reduced the number of desirable fish. Obviously, it was not through his meddling with wildlife that Man earned the *sapiens* part of his scientific name: *Homo sapiens*—Man the Wise.

Yet, today, if you mention the need of conservation of insects, you will be greeted either by an incredulous stare, a long laugh, or a snort of derision. The present attitude toward these numerous creatures, most of them harmless or beneficial, echoes the attitude of pioneer America toward all wildlife. It is well to remember that early writers confidently predicted that the wildlife of America was sufficient to feed the whole world forever! That is something to ponder on in these days of dwindling species. The super-insecticides and the improved techniques being developed in this war can mean to the insects what the invention of gunpowder, the gasoline-engine, and the match have meant to larger forms of wildlife. Perhaps we could spare the passenger pigeon and the buffalo; but we cannot spare the insects. Eliminate only a very few kinds of insects, and the world as we know it would alter immeasurably.

At the rate of more than 500 acres an hour, after-the-war airplanes can scatter DDT over the countryside. But such a plane would leave behind it far more than the fine particles of insecticide settling to earth. Its effect, if carried to its ultimate conclusion, would alter the whole face of the earth beneath its wings. If the insects, the good, bad, and indifferent insects, were wiped out in a wide area, the effects would be felt for generations to come. Songbirds, depending upon insects, or on seeds mainly produced by the pollinating activity of insects, would flee the area. A winter stillness would fall over the woods and fields. There would be no katydids, no crickets, no churring grasshoppers or shrilling locusts, no bright-winged and vocal birds. Trout and other gamefish, poisoned by the DDT or starving as the insects disappeared, would die in the lakes and mountain streams. Wildflowers, in all the infinite variety of their forms and shades, would gradually disappear from the openings and the hillsides. The landscape would become drab, clad in grays and greens and browns. Sweeping across the gardens and orchards of the area, a mysterious blight would cut the yield. Pumpkins and squash, apples and peaches, all the produce which depends upon the pollen-carrying work of the insects, would suddenly skyrocket in price. Seed would become worth its weight in gold and the value of farmlands would plunge downward. No drought, no flood, no hurricane could cause the widespread disaster that would follow in the train of the annihilation of the insects.

And that vacationist's paradise my acquaintance in the Adirondacks spoke so glibly of—what of it? It would be a paradise without blooming plants; without the perfume of flowers on the night air. It would be a paradise without the flash of a songbird's wing or the bright lilt of a songbird's voice. It would be a paradise without trout leaping from the brooks and lakes. It would be a paradise without the color of the butterfly's wing or the swift grace of the dragonfly or the busy hum of the wild bee. It would be a paradise without the distant croaking of the frogs or the long spring trill of the hylas. It would, it is true, be a paradise without gnats and mosquitoes and flies. But few people would notice this for they would be taking their vacations elsewhere. The DDT-produced paradise would have become an ex-paradise standing as a monument—a drab and dreary monument—to man's unteachable folly.

The thoughtful conservationist, reading all the unrestrained paeans of praise being written on the place of super-insecticides and bug blitzes in a future world, finds, here and there, some grounds for comfort. Government officials appear alive to the menace of indiscriminate insect-slaughter. Bee-keepers are lifting their organized voice in protest. Scientists of several bureaus in Washington are carrying on researches which will provide them with facts and figures. The U. S. Public Health Service is on guard. Such activity is our best bulwark against a popular outcry for a crusade against the insects—that and an understanding of what the consequences would mean. It is to be hoped that these two aids are effective. For, unless they are, Our Team is likely to make another spectacular end-run in the wrong direction.

VILLAGE IN THE TREE-TOP

(Continued from page 128)

its pale head in the doorway. The youngster was perhaps a trifle daunted by this first view of the world from so breath-taking a height, for it paused here as though uncertain of its next move. The mother bird, who had been flying in circles around the tree, now made a turn close before the nest, clucking as though to encourage her offspring. The young oropéndola launched forth. Without so much as touching the branches of the nest-tree, it followed her across the rivulet to a small tree on the hillside beyond, completing a flight of about two hundred feet on a slightly descending course—not a bad feat for wings that until that minute could never have been fully spread! Several other females, who had followed the fledgling on its first flight, joined the mother in driving away a brown jay, who had alighted in the tree where it perched. After feeding the youngster, the mother coaxed it still farther from the nest-tree. This was invariably the way, for the colony was too conspicuous and well known in the valley for the young to remain there with safety once they had forsaken the sheltering nest. Even the adults did not feel it safe to pass the night in a position so exposed.

After the departure of the last young oropéndola in June, the nest-tree beside the rivulet stood solitary like a deserted village, until the great woven pouches decayed and fell during the long rainy season.

YOUR 1945 VICTORY GARDEN

(Continued from page 150)

gardens last year also had flowers in them. If your lawn is seedy, and your borders have become cluttered with magenta phlox and other scrub stuff, why not do a little sprucing up? Many of the perennials may be grown from seed, root cuttings, or divisions. Annuals are easy to grow from seed, and are certainly an asset to any place. The investment in some plant food and insecticides for your flowers, and the rejuvenating of your lawn, will pay dividends in beauty and satisfaction.

And remember that we still need the food—here and over there. As Secretary of Agriculture Wickard recently said, "Though all of us can't dig fox holes over there, we can still dig—in our gardens over here—for victory."

Cornell Leaflet

At the start of each school year in September, the Cornell Rural School Leaflet, prepared by Dr. E. Laurence Palmer, is a teachers' number. That for September, 1944, being Volume 38, Number 1, is an outstanding one in the series. Its special value lies in the fine background material and inspiration it offers by tracing, or retracing, the early steps in American botany, zoology, earth science, education and Nature study. This is followed by a discussion of the history of the "Cornell Nature Study Idea," and its application.

WAR BOND MAN

— CLASS OF '63

Someday you'll want to see that boy, or girl, of yours off to college . . . and *right now* is not too early to start making plans.

Maybe your youngster, like so many other American boys, will work his way through school . . . but even in that case you'll want to be in a position to give him a little help if he needs it.

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AMERICAN NATURE ASSOCIATION

This is an official U. S. Treasury advertisement—prepared under auspices of Treasury Department and War Advertising Council

Science Talent

Forty high school boys and girls will visit Washington, D. C., in March to compete for the $11,000 Westinghouse Science Scholarships. This group has been selected, in the fourth annual Science Talent Search, from among some fifteen thousand entrants who competed in science aptitude examinations in 1850 high schools under the auspices of the Science Clubs of America. While in Washington the boys and girls will see the city, attend special meetings and talk with the judges about their scientific projects. These talks, considered together with the final examinations that put them in the select group of forty, will provide the basis for selection of the scholarship winners. These will be announced at a banquet ending the five-day visit to the capital. The judges will also name 260 honorable-mention winners, commending them to the attention of colleges throughout the country. Such winners in the second annual Search accepted scholarships worth nearly $62,500 offered them by colleges and universities. Finalists entering the armed services will have their awards held in trust for them until they are ready to take up their college education.

Oriole

Three readers (at this writing) have called to our attention the poetic affinity that exists between the poem, "The Oriole," by Fred F. Bradley, which appeared in our January issue, and "To An Oriole," written by Edgar Fawcett at least sixty years ago. Mr. Bradley's version, it develops, was a "reverie" and "adapted from memory." Under the circumstances, and in justice to Mr. Fawcett's memory, we feel that we should reproduce the original, which ran:

How falls it Oriole, thou has come to fly
In tropic splendor through our Northern sky?

At some glad moment was it Nature's choice
To dower a scrap of sunset with a voice?

Or did some orange tulip flaked with black,
In some forgotten garden, ages back

Yearning toward heaven until its wish was heard,
Desire unspeakably to be a bird?

Loooking Ahead

Looking ahead to the postwar world, North Carolina engaged Egon Glesinger, European forester, to make a survey. The results are published in a bulletin entitled "A Postwar Program for North Carolina's Forest Industries." It is brought out jointly by the Divisions of Commerce and Industry and Forestry of the Department of Conservation and Development at Raleigh.

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Liatris Scariosa—(Blazing Star)
Lobelia Cardinalis—(Cardinal Flower)
Lobelia Syphilitica—(Great Blue Lobelia)

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5 each or 25 plants for $4.50
10 each or 50 plants for $8.00

COLLECTION IV

Spring Flowering—Height 6 to 12 inches

Trillium Cerneum—(Nodding Trillium)
Trillium Erectum—(Purple Trillium)
Trillium Grandiflorum—(Large White Trillium)
Trillium Recurvatum—(Prairie Trillium)
Trillium Stylosum—(Rose Trillium)
Trillium Undulatum—(Painted Trillium)

1 each or 6 plants for $1.00
5 each or 30 plants for $4.50
10 each or 60 plants for $8.00

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THE ZODIACAL LIGHT

(Continued from page 158)

they are observing an interesting celestial phenomenon, the origin of which is still as much a matter of discussion as is the origin of the craters on the moon. It is a long time since Chaplain Jones made his remarkable observations, and few recorded observations of the zodiacal light within the tropics appear to have been made since that day.

The most favorable time to observe Mercury in the evening sky will be at its greatest eastern elongation on March 26, when it will set nearly two hours after the sun. Its stellar magnitude will then be zero, about 2½ times brighter than Spica or Regulus, slightly brighter than Capella. Venus is now rapidly approaching the sun and will be at its greatest brilliancy on March 10. By the end of the month it will set about 2½ hours after the sun. Mars is still poorly placed for observation in the morning sky, in Capricornus. Jupiter will be in opposition with the sun on March 13, and will then rise at sunset nearly due east. It is near the boundary between the constellations of Leo and Virgo. Saturn will be in quadrature with the sun on March 25, and will then be close to the meridian at sunset in Gemini.

On March 20, at 7:38 P.M., Eastern War Time, the sun will cross the equator coming north and spring will commence in the northern hemisphere, and fall in the southern hemisphere.

SOME GROW LITTLER

(Continued from page 136)

reared until they are well-feathered and obese, then "are left to their own devices for at least a quarter of the calendar year . . . the long fast of the chicks enables them to redistribute their tissue, and to convert mere weight into strength of bone and muscle."

Reducing, a process more often thought of than undertaken by human beings—this is normal and obligatory among certain birds. The means by which it is accomplished, that is by partial or complete fasting, explains both its effectiveness with birds and its unpopularity with us.

A COUGAR IN THE HOUSE

(Continued from page 147)

for her amusement, are completely ignored. An improvised stocking ball meets with her approval, and is carried around all through the day. Dragging any available item of clothing to a hiding place, usually under a bed, is another cougar trick. On laundry day that is the first place one hunts for a missing article of clothing.

Cookie gets along very well with the house cats, although often becomes a bit rough in playing with them. The result is that the cats jump to the highest spot in the house, leaving Cookie to finish her game alone. When all of our pets become drowsy it is a common sight to see them curled up with Cookie.

In captivity wild pets often do things they would avoid doing in their natural habitat. For example, Cookie persists in swimming in our large fish pond, and for this reason must be watched closely when taken outdoors. She bothers neither the goldfish nor the water plants, merely gliding around in the water. Wild forest dwellers avoid camp fires and flee from forest fires, yet Cookie will sleep for hours in front of our fireplace. Car riding meets with her approval also, and always ends up with a soundly sleeping cougar. It annoys her, however, to have to share the back seat, which is "her" seat. Many house cats have a fear of brooms and mops, but Cookie likes nothing better than to hang on to either item, making such chores more like a game than housework.

We have often read of folks raising cougars with great success, although in most cases the occasions took place in the country or mountains. It will be interesting to note just how long our pet will be manageable in the close confines of city house and yard.

SOME BIRDS THAT NEST IN THE NORTH

(Continued from page 133)

well represented by the western tree sparrow, the golden-crowned sparrow, the fox sparrow, and others. The Bohemian waxwing ventures as far north as the Kobuk River Valley.

The robin is a familiar visitor at Nome, Kotzebue Sound and all through the Yukon Valley, as is also the rusty blackbird. Even the black-capped chickadee is a summer resident. The Alaska longspur is plentiful clear up to Point Barrow. The ubiquitous raven is to be seen almost anywhere in winter, even north of the Brooks Range.

In the willows on the flat deltas of the Noatak River mouth I found nests of the rusty blackbirds. Nearby, stalking over the mud flats, were pairs of the little brown cranes, finding a living in their own manner as they prepared to go to housekeeping for the season.

The air on the tundras was filled with the notes of the Alaska longspur. The phalaropes whirled in their fantastic dances on the surface of the pools; the robins built nests under the eaves and on the ends of the logs of the deserted miner's cabins, whose tenants had disappeared with the throngs of the gold days. Among the feathered population there was not a single loiterer in the land. Each and every couple was busily preparing for housekeeping, and for the rearing of the tiny fledglings that were coming. Time was short. Arctic summers are sudden and fleeting, as well as beautiful, and all Nature works overtime.

SKUNKS DIG POTATOES

By EDWIN LINCOLN MOSELEY

When farmer Tilton went to his potato field one morning early last fall he was surprised to find more than twenty bushels of the tubers already dug and lying on the surface. The digger had been thorough in his work, having removed every potato from those hills that he had opened.

White grubs, the larvae of May beetles, were unusually numerous in 1944. The mature beetles are familiar to people who have been awakened by the noise they make after entering unscreened bedrooms during the first warm nights of the year. In the course of three nights one spring we trapped more than two thousand of these large beetles by hanging a lantern from a limb of a cherry tree. Cherry foliage is their favorite food. Attracted by the light, they struck against the inside of a metal tub whose upper edge was at the level of the light. They fell into the water in the tub and later were fed to the chickens.

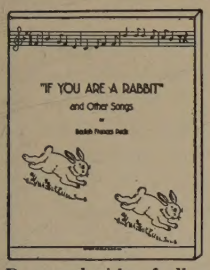
The usual food of May beetle larvae is grass roots, but when they are as abundant as they were last year they eat a variety of vegetable food, including flower bulbs, carrots, beets, and potato tubers. The grubs, in turn, are tasty morsels for many kinds of birds as well as for moles and skunks. In northwestern Ohio an abundance of both of these animals was observed in 1944. It was their liking for grubs that caused the skunks to dig so many potatoes.

Amphibians and Reptiles

Amphibians and Reptiles of the Chicago Area. By Clifford H. Pope. Chicago. 1944. Chicago Museum of Natural History Press. 275 pages. Illustrated in color and black and white. $1.75.

Fifty-two kinds of reptiles and amphibians are found in the Chicago area, which, for the purposes of this valuable book, covers fifteen counties in Illinois and Indiana, one in Michigan and three in Wisconsin. The author, Curator of Amphibians and Reptiles at the Chicago Museum of Natural History, presents his text in the simplest possible way consistent with identification of the animals themselves. For each species he discusses the life habits, range and economic importance. The text is supplemented by helpful line drawings and by twelve plates, five of them in color. This is an extremely useful handbook, valuable far beyond the immediate geographical area it covers.

Let's All Sing!



One of the problems at camps for boys and girls is to get suitable songs on Nature and the outdoors for the daily song sessions.

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"These are tangible results of which we can all be justly proud," the letter says. "You have played an indispensable part in this gigantic sales program. And your publication belongs in the front row of those who have made possible this support."

Redwoods as Tribute

A National Tribute Grove in the primeval redwood forest of the Pacific Coast is to be established in honor of the men and women who are serving, or have served, in the armed forces of the United States during World War II. The Garden Club of America and the Save-the-Redwoods League are jointly sponsoring this, together with a group of other national organizations. The gratitude of the nation will thus be eternally expressed by dedication of a grove of redwoods of great beauty and magnitude. Contributions from numerous individuals, firms and organizations will provide for establishment of this grove as a tribute to their sons and daughters and their employes in the armed services. The names of those so honored will be recorded and enshrined in appropriate manner. The treasurer of the fund is Dr. Robert G. Sproul, University of California, Berkeley, California.

World Waterfalls

Principal Waterfalls of the World is the title of a special number of *Yosemite Nature Notes*, published by the Yosemite Natural History Association, Yosemite National Park, California. This interesting and attractive 32-page pamphlet has been prepared by C. Frank Brockman, Park Naturalist at Yosemite. King of all the waterfalls, from the point of view of height, is Angel Fall in Venezuela, with a plunge of 3,300 feet. Second comes Yosemite Falls, which drops 2,425 feet. Two other falls in Yosemite National Park come next, with 2,000-foot drops. In this booklet most attention is given, of course, to the falls in Yosemite, and other cataracts are discussed from the point of view of their relation to these. Copies of this publication sell for twenty-five cents. It should be ordered direct from the Yosemite Natural History Association. Membership in the Association is one dollar a year, including the issues of *Nature Notes*.

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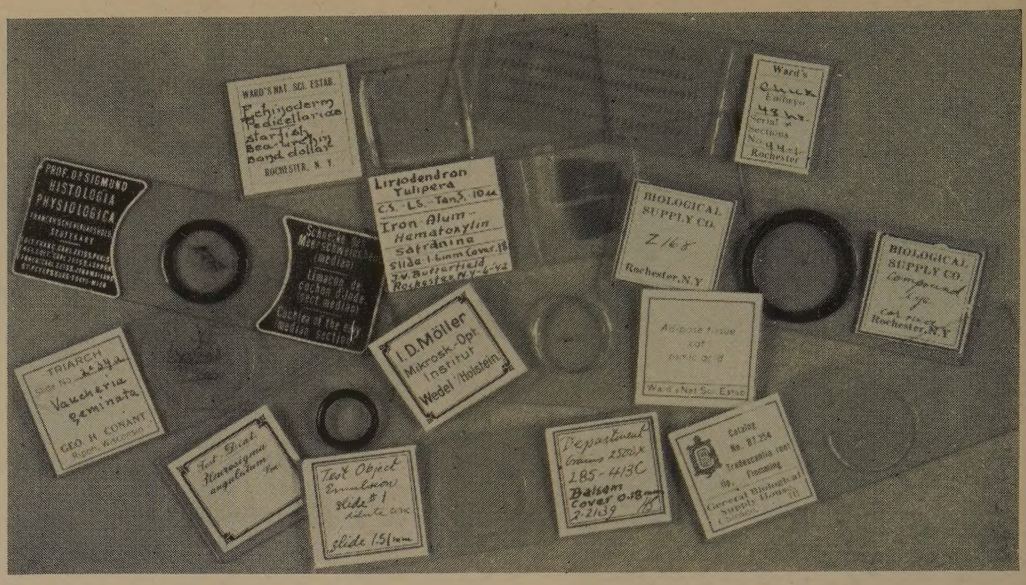


Paper labels of various styles, show how neatly the records may be kept.

Under the Microscope

By JULIAN D. CORRINGTON

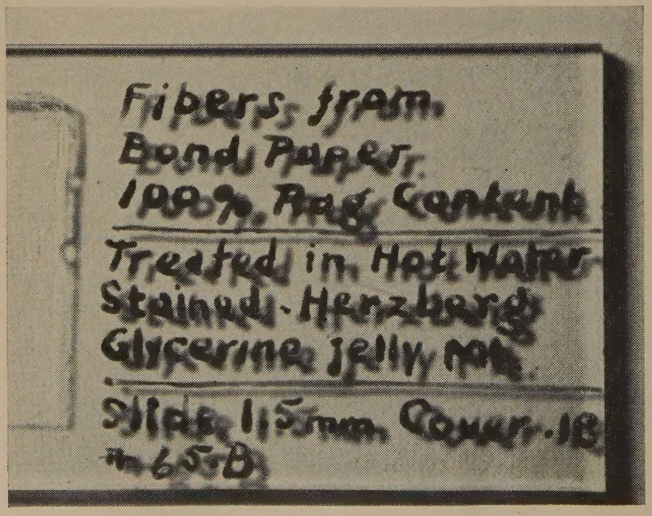
CLEANING AND LABELING SLIDES

ALTHOUGH Romeo questioned the importance of an appellation and stated that a rose by any other name would smell as sweet, the microscopist does not have to be very experienced to realize that a slide without a label is practically valueless. Some of us have an innate sense of neatness that instinctively recoils at slovenly preparations; we feel that if the cleaning and labeling of a slide are sloppily done, the technique is probably of the same quality. This is not invariably true; we have seen some superb whole mounts, beautifully flattened, oriented, and stained, by persons expert at this type of work, yet never cleaned up after completion, and labeled in the most sketchy and haphazard fashion. As a rule, though, a careful and experienced technician will take just as much pains with the finishing of his slide as during any other operation, and will frequently embellish his work with colored rings and other superfluous ornamentation, just for the artistry of the job. A good slide deserves a good appearance.

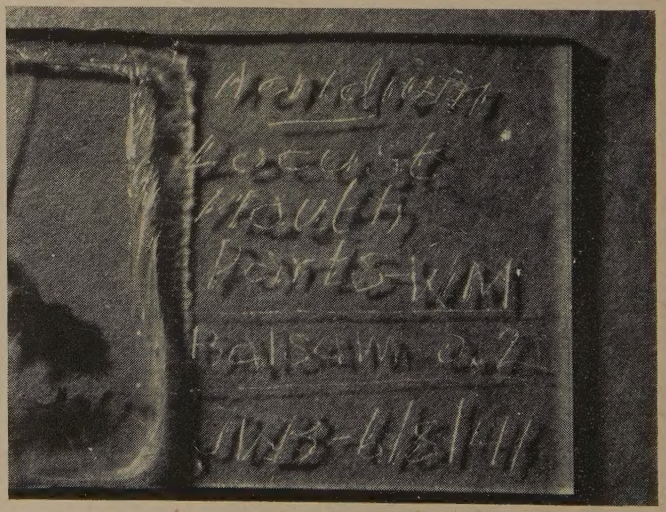
There are different ways and means of finishing slides, and it behooves the beginner and often the professional microscopist to pay more attention to this sequence in technique than he may have thought necessary; appearances count for a great deal, and neatness and system in all things are most desirable qualifications.

When a completed mount has dried and set thoroughly, so that the balsam or other mountant is fully hardened, the fine blade of a penknife is used to scrape off any balsam that has exuded from under the cover glass. Balsam will flake off easily, but caution must be employed, not permitting the knife blade to touch the cover, as this thin glass is readily shattered by contact with anything so hard as metal. One careless movement may undo all the previous labor; scrape up to the cover, but no farther. Balsam on top of the cover can be removed in this manner, or by gradual and careful shaving with a safety-razor blade, but such operations are very risky; it is better to take extra time and patience for the slower process of dissolving the balsam by repeated applications of a fine pledget moistened with xylene. A pledget is made by wrapping a tiny wisp of cotton around the end of a dissecting needle or a toothpick. Avoid letting xylene contact the balsam under the cover; the job is tedious and there is no safe short cut. Prevention, as usual, is more to be desired than a cure, and, with some experience, there should be no excess balsam to remove; the technician soon learns the right amount to apply in most cases.

The slide is next cleaned and polished with a paste made by adding a few drops of xylene to a small quantity of powdered Bon Ami or to Calgonite, a newer product of marvelous



Slide labeled with glass-writing ink.



Data scratched into slide with diamond pencil.

BICHROMATE-SULPHURIC GLASS-CLEANING MIXTURE

Potassium bichromate	10 g.
Sulphuric acid, concentrated, commercial	40 cc.
Water, tap	50 cc.

Dissolve bichromate crystals in the water by heating, then cool. Add the acid, a very little at a time, as the reaction generates a terrific heat. Never add the water to the acid; always the acid to the water. Use full strength or diluted with more water, using the same precautions. Avoid getting this strong reagent on hands or clothing; do not pour it down sinks.

efficiency as a laboratory glassware cleanser. Scour around the covered area with a pledget, and apply gingerly to the top of the cover. Always use xylene very sparingly and never flood the slide with this reagent; it will soften the balsam under the cover and may easily ruin the mount. In preparations where no excess balsam is present, a simple washing in warm, but never hot, soap suds will suffice, although the scouring with xylene paste will usually impart a higher polish. Finish by shining up the slide with a soft old piece of linen; worn-out handkerchiefs should be saved for this use.

Stains on the uncovered portions of the slide must be removed by employing their solvents; hot water, strong alcohol, or, in stubborn cases, the ultimate cleaner, bichromate-sulphuric mixture. All of these must be kept away from the balsam under the cover; they are apt to soften it, turn it opaque, or cause other deterioration. Use a pledget or immerse only the two ends of the slide, in succession, taking care lest these fluids creep up to the balsamed area by capillarity; keep the central third of the slide perfectly dry.

The main points to remember in cleaning finished mounts are that heat will melt balsam and xylene dissolve it, while other reagents will probably affect it adversely, hence any procedures must be planned with these factors in mind.

When polished and dry, the cleaned slide is ready for labeling, and here there are two main considerations: method and content. As to methods of labeling, there is a wide latitude, including various styles of gummed paper labels on the one hand, and writing directly on the slide with any of several materials on the other. Choice of method is often a matter of habit or may be due to lack of knowledge of the variety of possible methods; but it should be governed by the needs of particular cases, just as one chooses the fixer or stain for a given object.

Commercial supply houses use paper labels with the firm name and location machine-printed, the data either hand or machine-printed. The amateur microscopist may, at small cost, order a supply of blank labels from one of these firms, with his name across the top, his city across the bottom, machine-printed; otherwise he will generally buy ordinary blank labels, obtainable in boxes or in perforated rolls or books. The pathologist, in most cases, deals with large numbers of slides that have only a temporary value; he is not concerned with either neatness or permanency, his slides will be discarded periodically, and he must place speed and accuracy above other features; so he chooses the method of writing directly on the glass slide with a colored wax pencil, or with one of the glass-writing inks, and he may either include all pertinent data, with a code or serial number referable to his card index records, or, where the amount of material to be written is too great, merely the serial number. Similarly, the research worker and the slide preparator of commercial, university, industrial, or hospital laboratories, will temporarily mark his slides with a wax pencil during processing, and will permanently label only those slides that are to be retained more or less permanently in his collection of slides.

Most enduring of all methods is that of scratching or etching the glass itself. The data may be written with a diamond or carborundum point stylus. As shown by one of our illustrations, however, such script is neither neat nor easily legible. Writing with hydrofluoric acid, which etches the glass, lends itself to a more flowing penmanship, but the reagent is dangerous and the method too tedious to be justified by the slight improvement in appearance. If the recording of the data is really important, as in autopsy material from a case of suspected homicide, or studies in particular strains of such pathogens as malarial parasites, or researches in chromosome number and behavior, a serial number should by all means be scratched on the slide with a diamond. This number is then covered over with a paper label and does not show, but if the label should be lost later the details are recoverable by referring to the card index files. Ordinarily such a precaution is unnecessary.

Second in permanence are the familiar gummed labels; if these are put on carefully they should satisfy all usual demands. Moistening with the tongue is preferable to any other means. Affix the label in correctly squared position, then cover the forefinger with a soft clean cloth, as an old handkerchief, and press down firmly, ironing from the center outward in all directions, wiping away any adhesive that exudes from the margins. Finish by going around all four edges. If the glass is free from grease, a label so

References for the Microscopist

(Third List)

In previous issues we have offered a number of important texts and reference works on the microscope, microtechnique, and various background sciences. This third listing includes five additional subjects, all of them important to the microscopist who wishes to build on firm foundations. We suggest you add some of these titles to your library; mention them to friends and family as suitable remembrances; note them as gifts for that fellow microscopist.

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fastened should never become loose. Labels are more easily printed upon before affixing, but make certain that the ink has dried thoroughly before pressing on them. Best custom is to apply the label at the left side of the cover glass, since some microscopes are equipped with a mechanical stage requiring the reading of a scale through the right half of the slide. Two labels, one on each side of the cover, may be used whenever necessary—justified only when data are lengthy.

Special labels are sometimes desirable for special purposes. Note the narrow one, in the illustration of paper labels, for a slide that is part of a set of serial sections of a chick embryo, for which a large rectangular cover glass must be used. We have also had made other such narrow labels, with cautionary instructions printed in bold type: *Do not use high power with this slide* for thick mounts, uncovered Golgi preparations, or others where a careless swinging to the high power objective would be likely to crack the cover or ruin the mount; *Keep this slide flat!* for whole mounts of sands, foraminifera, starfish eggs, and other objects certain to drift, in time, to one edge of the cover if the slide is allowed to stand vertically in a container. These cautionary labels are placed to the right of the cover, supplementing the regulation descriptive label on the left.

During processing, a slide is best given a temporary label or serial number with a glass-writing pencil, made of soft wax and obtainable in several choices of colors, yellow being our favorite for legibility.

The data to be included on the label are also determined by the needs of particular cases. Simplified labeling is to be preferred for routine mounts, and in such cases put first things first. For example:

CAT	ILEUM
Ileum	Cat
c s	c s
(wrong)	(right)

In the above, the slide is made in order to study the histology of the ileum, a portion of the small intestine; whether the preparation was obtained from cat, dog, man, rat, or some other mammal is quite secondary in importance. The label is as terse as possible, and standard abbreviations are frequent, as "cs" for cross section. Detailed treatment of the same subject might read:

ILEUM

Cat, cs
Zenker's; H&E
10mu Clarite
3/7/45—P. J. Jones

Here the fixer (Zenker's), stain (H&E for hematoxylin and eosin), thickness of section (10 mu), mountant (Clarite), date of completion, and name of preparator are all compactly included. Many studies require that the thickness of the slide and the cover glass be known.

For routine work, designation of the fixer is unimportant, but the stains should be stated. The mountant need be specified only if it is other than balsam. As would be expected, research and specialized slides of all types should be very fully labeled, or else the data given on a card bearing the same serial number as that placed on the slide. Standard abbreviations for planes of sections are: cs for cross section or ts for tranverse section, synonymous terms; ls, longitudinal; ss or sag s, sagittal; vs, vertical; hs, horizontal; fs, frontal; tan s, tangential; rs, radial. Wm is used for whole mount.

Printing is nearly always neater than script; if the preparator tells us that he does not know how to print, our reply is that printing is an asset to anyone's stock in trade and that slide labeling is a good way to break in and an excuse to learn to print correctly and neatly. In any case the medium should be black India ink and the implement a fine steel pen—crowquill, eaglequill, Gillot, Spencerian No. 1, or other type according to amount of data to be written and personal preference. Machine-printed labels are out of the question save in quantity production of standard items, or by those who happen to own a home printing plant. Typewriting is too large and does not look well, unless a miniature type face is available. Nothing excels a carefully and neatly handprinted label, boldly executed in black ink, and nothing gives a poorer impression of personal characteristics and habits than a slovenly label, done just any old way with whatever was at hand at the moment—pencil, fountain pen, blue ink—scribbled on in a hasty script, without plan as to content, size, spacing, or other elements of neatness. The finished worker takes pride in his work.

DR. GAGE ENDS DISTINGUISHED CAREER

Microscopical science lost its oldest and most loved leader with the death, on October 20, 1944, at the age of 93, of Dr. Simon Henry Gage, Emeritus Professor of Histology and Embryology at Cornell University.

Dr. Gage was born in Otsego County, New York, May 20, 1851, and attended Cornell as an undergraduate from 1873 to 1877. Receiving an appointment as laboratory assistant after graduation, he rose rapidly through the various professorial grades to the rank of professor of histology and embryology, served in that capacity at the New York State Veterinary College at Cornell when that school was established in 1896, and moved to Stimson Hall, the home of the University's Medical College, in 1901, maintaining an office in that building ever since. In 1908 he retired, with a special grant from the Carnegie Foundation that permitted him to devote his full time to research, and was active right up to the period of his death, collapsing in his laboratory on October 11.

There have been numerous testimonial dinners to Dr. Gage, tendered by his many friends, students, and colleagues, as he successively passed milestones that few attain. He was a most remarkable man in every respect, remaining ever young in vigor and spirit; one of those rare individuals who achieve an exceptional age without senility, fully active to the last. Even after passing fourscore years and ten, he was to be found in his laboratory daily and was completing a work on the history of microscopy in America at the time of his death. Doubtless best known to the scientific public of recent years through his famous book, *The Microscope*, the 17th edition of which appeared on his 90th birthday, he had written nearly 200 books, articles, and reviews. These covered many fields in biology, though microscopy has always been his chief interest. He has twice been President of the American Microscopical Society and twice Vice-President (the presiding officer) of the Zoological Section of the American Association for the Advancement of Science. He has been for years an active leader among officials of the Wistar Institute of Anatomy of Philadelphia.

In 1939, upon the founding under auspices of *Nature Magazine* of the American Society of Amateur Microscopists, Dr. Gage graciously consented to serve as its first president, lending his name and prestige to a new and struggling group, whose success could be regarded at best as problematical. Acting in this capacity until a few weeks before his death, he contributed articles, memberships, advice, and in many other ways aided this project, which he deemed most worthy and important, and saw the enrollment pass the twelve hundred mark, and the *Bulletin* well into its second volume. Himself over ninety, Dr. Gage could yet write us letters filled with enthusiasm over the training of youth in microscopical science. The A.S.A.M. members in whom he took the greatest interest were those in their teens. "Give the young people every opportunity," he said.

This great interest, a symptom of his outstanding merits as a teacher, was fittingly recognized by the establishment of a graduate fellowship, the Simon Henry Gage Fellowship in Animal Biology, presented to Cornell by his friends on the occasion of a dinner honoring his 65th birthday, and completed at a similar banquet on his 90th birthday. A full account of this affair, with a portrait of Dr. Gage, appeared in these columns in the issue for August-September, 1941.